approach

August 1966

THE NAVAL AVIATION SAFETY REVIEW

The key to safety is professionalism.

IMPROVING THE ODDS

By CDR J.H. Foxgrover, VC-8

A Memo from the Skipper

Aviation safety is a primary responsibility of command. A clear and generally accepted philosophy of safety is the fundamental building block upon which our accident prevention program must stand. This philosophy starts at the top and flows through the chain of understanding, initiated through leadership and sustained by continuing reenforcement. Remember that the professional competence of the officers and petty officers in a squadron facilitates accident prevention more than any other factor.

A recent issue of the *Weekly Summary of Aircraft Accidents* contained some very interesting results of a study which indicated that "the odds appear to be over four to one that an A-4, F-4 or F-8 squadron will have an accident—unless the necessary action is taken to enhance operational readiness." The study also showed that 58 percent more accidents occur during the six-month period following a change of command than in the second six months.

Having recently assumed command myself, I am vitally interested in these statistics. All five of my immediate predecessors in command of this squadron experienced at least one aircraft accident during their tours, and, as a result of these accidents, there have been four fatalities in less than five years. If the preceding odds appear grim, let's adjust them for some of the detrimental factors peculiar to our own organization. When you combine the operation of six different models of aircraft with a severe personnel shortage, the odds for an aircraft accident would appear to be increased to a level in excess of 5 to 1!

Obviously we don't want to operate under such conditions. What, then are we going to do to improve the odds? This is the challenge our philosophy must overcome. The key to *safety*, of course, is *professionalism*. As professional aviators and flight officers, as well as naval officers, our objective is

The well-led and disciplined crewmember needn't sweat a surprise gear inspection.

operational readiness. Safe operations are an inescapable byproduct of the *professional approach to operational readiness.*

Professionalism is primarily influenced by our attitude toward our job. A professional attitude is reflected in a pilot's knowledge of his aircraft and personal limitations, detailed flight planning and briefing, voice procedures, complete and accurately written yellow sheet discrepancies and a myriad of other factors which separate the routine from the "well done." The professional naval officer possesses many of these characteristics common to professionals in other fields, such as doctors, lawyers or statesmen. Some of these attributes are: a discerning mind, the acceptance of responsibility, a creative mind, command ability, objectivity and self-reliance combined with a willingness to draw on the talents of others.

Just as the characteristics of the professional attitude directly affect the safety program, the program itself affects every task we perform in the accomplishment of the squadron mission. The aspect of safety transcends all levels of command and influences every task we perform. Because of this, it is not enough that we merely have an Aviation Safety Officer assigned. Although he may well be the eyes and ears in the aviation safety area, as an individual he cannot be omniclairvoyant. But collectively we have no blind spots.

Professionalism corrects astigmatism. To this end I expect every officer and supervisor to consider himself a safety officer in his every endeavor. Our attitude towards aviation safety cannot help but influence the standard of our professional performance. I am not saying that we will be shortened by a head if we don't expound on safety at every morning meeting, but I cannot conceive of a professionally enquiring mind not contributing something in this area. Although I may not be immediately informed of the contribution, I shall directly be aware of the result.

Maintenance

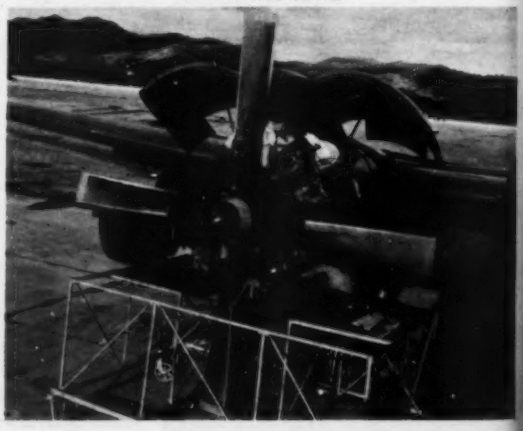
Professionalism can accomplish a great deal in the maintenance field.

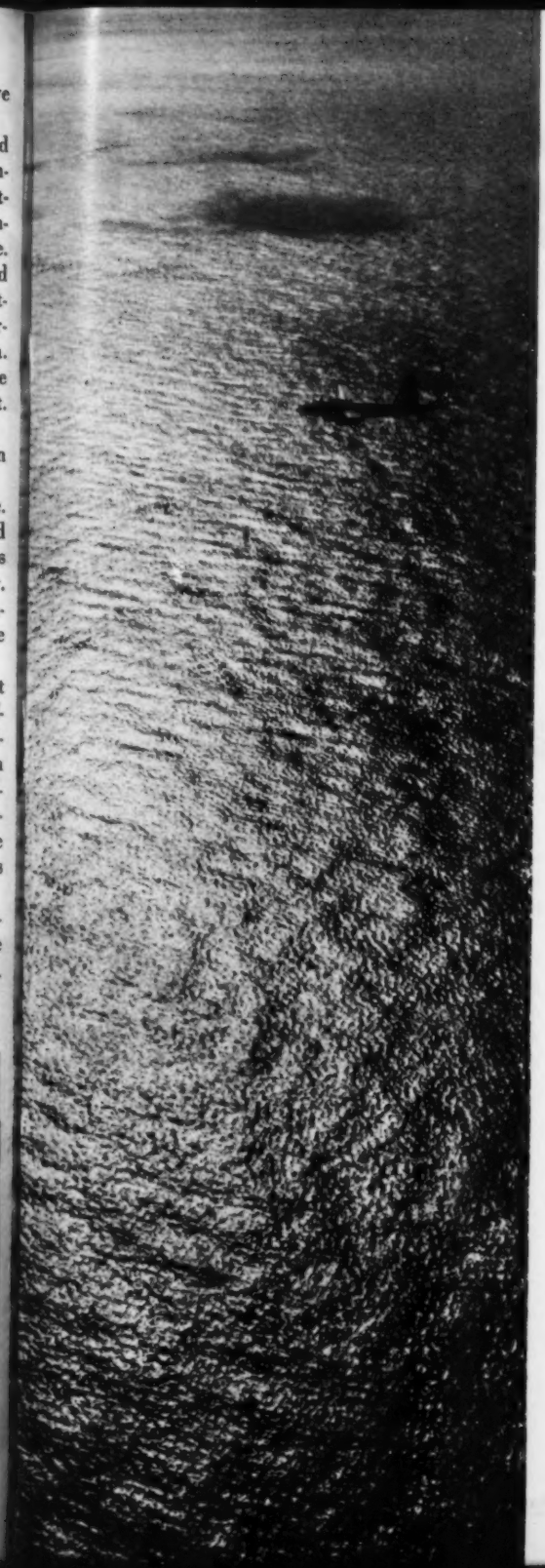
Take *supervision and quality control* for example. Without these essentials we might as well discard the entire maintenance safety program. Supervisors who are not on the job leave the door open to error. The vital functions of quality control are not signing the inspection card, but rather verifying the correct completion of a task.

Another area of maintenance that needs constant supervision and emphasis is *aircraft ground handling.* The Navy-wide total of needless ground handling accidents is staggering. We must always be on our guard to eliminate careless and preoccupied vehicle operation by continuously reviewing the performance and qualifications of drivers and plane captains and ensuring safe, standardized procedures during line operations.

The measure of maintenance performance is *efficiency.* A good indicator of this efficiency is the frequency of repeated discrepancies on yellow sheets.

Supervisors not on the job leave the door open to maintenance errors.





Since accidents have occurred in the fleet due to non-correction and the cumulative total of aircraft discrepancies, pilots must ensure complete and accurate reporting and shop personnel must be available to advise and troubleshoot each discrepancy. Another measure of maintenance efficiency is the physical condition of our aircraft, ground support equipment, test equipment and tools. We cannot operate with improper or faulty equipment, and, indeed, it is dangerous to do so.

Operations

In this area professionalism can eliminate the haste and complacency which are sometimes prime contributors to pilot error accidents.

The Type Leader Program is an example of the professional approach to operations. This program is a vital element in developing individual pilot proficiency, maintenance coordination, updating the SOPs, standardizing procedures and briefing on current aircraft and related safety data. Frequent review and evaluation of inflight emergency procedures is mandatory. We must never allow a misguided loyalty to influence our decisions regarding flying personnel who have demonstrated unsafe tendencies or practices. The emphasis of professionalism requires sustained peak performance.

Scheduling with care to avoid fatigue is very important. We will always encourage flying personnel to maintain an optimum state of physical readiness. We must not let the "tiger" attitude override the need to consult the flight surgeon when necessary. The participation of civilian technical representatives and the flight surgeon is encouraged to balance out the quality of our training program. When a professional organization cannot meet a scheduled commitment on time, the reasons will be readily apparent.

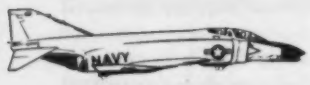
In this memorandum I have tried to form the guidelines of professionalism as our philosophy in the development of our operational readiness. Where I have been detailed, I have done so by way of example. If I was even aware of all the details, this would be a squadron instruction instead of a memorandum. I expect that through your leadership every member of this command will be aware of my interest in the safety of aircraft operations and the import of their individual effort in the teamwork required. If we are successful in our program, that is if we prevent the preventable, it will be due to the mutual effort of All Hands. A successful program is a contributing program, not only within the command, but from the command to the fleet. Remember, safety, like an accident, just doesn't happen—*it is caused.*

Design for

I think the engine stalled. . . . Would you check it over and, oh yeah . . . . let me know whatcha find?"

That's what LT Staller (F-4B driver) said to the maintenance crew chief after yesterday's hop. That was the same bird in which I had experienced a compressor rumble no more than two days ago. I didn't write it up because I thought I'd goofed in my pull-up on a low-level recco pass. But then my curiosity got to me so I called up an old friend, A. Grate D'Zeiner, for some facts.

"Well, the perfect compressor would operate on an isentropic process. Now, an isentropic process results in a minimum temperature ratio across the compressor for a given pressure ratio. Therefore, the efficiency. . ."

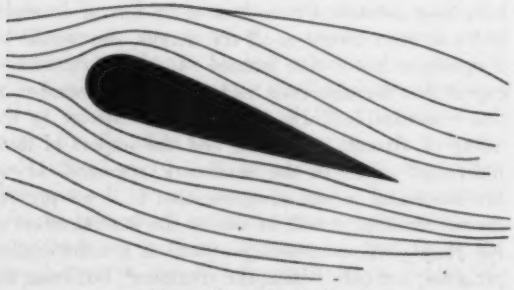


"Hold on," I interrupted. "In plain language, why does an engine stall?" Well, I still didn't get very far but I remembered some articles I'd seen in the readyroom.

First, let's clear up one point! All explosive sounds, whines and growls or similar sensations you might experience are not engine stalls. But before we get into the recognition of an engine stall, it would help to know what happens and why.

We're all familiar with the way an aircraft wing stalls. When the angle of attack is increased beyond a critical value the lift rapidly decreases and the drag increases greatly. Figure 1 shows a simplified airfoil and this effect. Since the axial flow compressor is made up of a series of specially shaped airfoils, the

Fig. 1



Normal Attack Angle

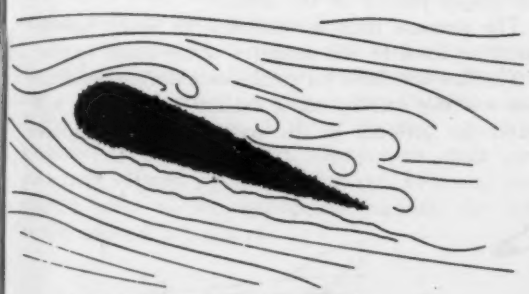
High Attack Angle

r Stall

By E.L Venturini
Manager,
Flight Propulsion Division
of G.E.

application of this principle applies as well to the axial flow compressor of a jet engine. I mention axial flow because most of our equipment these days is this type.

The compressor rotor has hundreds of fixed airfoils rotating like a propeller blade, each one creating a pressure rise in the air being supplied to the combustion section. The compressor stator which is also comprised of hundreds of fixed airfoils, however stationary, directs air in the compressor cycles. In the process either blades have the capability of stalling much the same way as the airplane wing. If you isolate one blade in the compressor rotor for a closer look, Fig. 2, next page, you see a cross-section of a blade airfoil; it's rotational speed vector and the air direction with its velocity vector.



Normal Attack Angle, Rough Surface

As in the case of an aircraft wing, if the angle of attack is too great, the airfoil will stall. It is not necessary that the entire airfoil be involved. A stall can initiate in the tip or hub area, persist as such or progress into a full fledged stall. Since the blade is fixed, what changes the angle of attack? There are four factors that influence this; (1) the air velocity, (2) the blade or engine speed, (3) the stator vane position and (4) the desired pressure rise.

The diagram in Fig. 2 depicts one given condition, and a similar diagram can be shown for a stator blade. The compressor must be designed to function efficiently at an indefinite number of conditions as set forth by aircraft speed and altitude and all kinds of weather. That is, inlet air temperature, pressure and humidity, as well as the engine RPM and its condition.

Continued

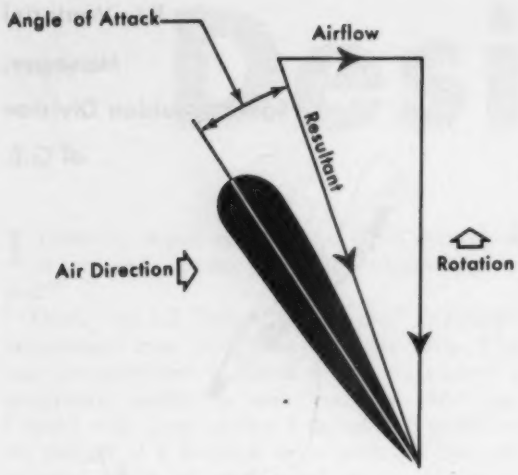


Fig. 2

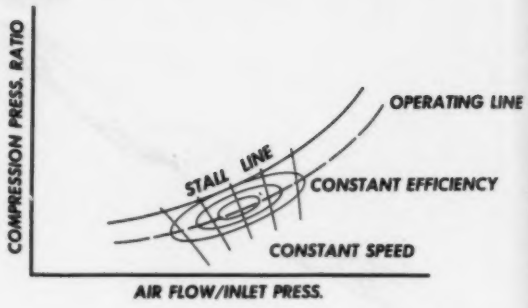


Fig. 3

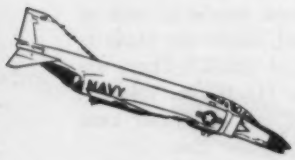
As an example, let's consider a case where the engine is running at a stabilized speed. Air enters the compressor flowing axially; however, to the rotating blade it appears to be flowing in the direction of the resultant as shown in Fig. 2. The air is compressed and in the process, exits each stage with a velocity somewhat in the direction of rotation. Stator vanes then turn the air to the proper direction or angle of attack for the next compressor cycle, etc., through the entire compressor. Now that's for only one condition. As mentioned, in the design of a compressor many variables must be considered. The engine speed may vary from 0 to 15,000 rpm, engine inlet temperature from well below freezing to above boiling and operation at all sorts of altitudes. The compressor, irrespective of conditions, must produce and yet not stall.

How's this done? For every compressor design, a dimensionless plot can be made of compression ratio versus air flow. A typical compressor map is shown in Fig. 3. The diagram also defines the constant speed and efficiency lines. Air flow increases with speed, and to gain efficiency and better performance, a greater pressure ratio must be realized. The higher the pressure ratio, the higher the angle of attack and operation closer to the stall line. However, operation here is critical, and stepping over the line will lead to a stall. So what happens . . . . you devise an operating line which skirts the critical line with some degree of margin.

The operating line is the product of much development testing and engineering judgment. Operation of the engine along this path is accomplished in many different ways. In the variable compressor stator system, the early stage vanes are positioned as a function of inlet temperature and engine speed to maintain the proper control of the airflow.

The pressure ratio is controlled by many parameters, yet fixed by the geometry of the basic engine.

The fuel scheduled for combustion during acceleration and the corresponding exhaust nozzle area will affect the pressure in the system. These schedules



must be compatible. Dual-spooled compressors accomplish much the same end by providing an RPM match between forward and aft stages at all speed points (higher speed ratio in aft stages during acceleration. A compressor bleed air system regulates the pressure rise in the transient speed range. Once a suitable operating line is established, intentional stall tests are conducted to evaluate the final product.

Now that's how it works, but why doesn't it always?

I'm glad you asked! The conditions we've discussed were ideal with only some degree of provisions for changes in stall margin which may come about in the course of field operation. The compressor air flow characteristics will change as affected by airfoil corrosion, dirt and even foreign object damage. Control schedules or regulating valve operation can change with time.

When the airfoil surfaces of the compressor become rough from corrosion or dirt deposits, the airfoil becomes prone to flow separation, turbulence and eventually stall. Obviously the answer to this problem is corrosive resistant materials or protective coatings.

Well, both approaches have shown significant improvement in the past few years and are being incorporated in the engine designs. Wash—oil and walnut shelling techniques have been developed to clean up the old designs and keep them going between overhauls.

Foreign object damage to compressors has taken its toll in causing stalls. It is not hard to understand why the disturbance generated would cause a stall. See Fig. 4. The turbulence created would be comparable to that of an iced wing or as in a high angle of attack.

Nothing's been mentioned about aircraft/pilot induced stalls. These occur from the ingestion of hot gases from rockets or guns, inlet ramp schedule failures, spins or other exotic *maneuvers*—all produce a distorted pressure profile at the engine inlet. The cases cited here have caused engines to stall which were not even stall prone.

The symptoms of an engine stall may vary among the different aircraft, however, most common displays are a sudden increase in exhaust temperatures, some RPM loss or hang-up, a thrust decrease and frequently an audible report. Compressor stalls are generally cleared by reducing power, however, one should refer to the appropriate manuals for the recommended procedures.

Fig. 4

Now let's review . . . Oh, there's the maintenance chief Ringitout, on that bird LT Staller brought back.

"Hey Chief, Whadya find?"

"Afraid it's FOD sir!"

FOD huh . . . wonder what they call FOD in foreign countries? Whatever it's called it's costly, and won't Staller be happy to hear the news, being the maintenance officer.

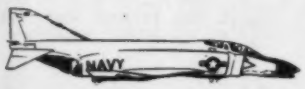
What about maintenance? Can't we reduce the stall incidents with improved maintenance? No question about it.

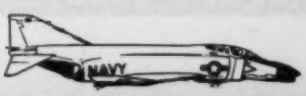
You recall the cause factors: Compressor corrosion, FOD, exhaust nozzle malfunction, fuel control schedule, inlet ramp failure. Many can't be foreseen it's true, but still a good percentage are not recognized during maintenance.

In summary, the best pilots are familiar with the recognition and proper corrective measures in abnormal or emergency conditions . . . keep ahead or at least current on engine stalls. And mechanics, your work should never stop in preventing stalls through good maintenance practices.

Don't forget, if you guess, you might be wrong and if you think you guessed right, you only thought you knew! Be professional. *Know the bird cold* and operate it IAW NATOPS.

(*Ed Note*: *For an additional treatment of this subject see "A Stitch in Time" June 66 issue of* APPROACH.)





The Professional Approach

From flight training on, you've probably been admonished to study the approach plate, but what do you study on it?

Departing an overseas base, a (Navy operated) MAC C-130E pilot was instructed to contact GCA for a radar monitored departure. Immediately after liftoff, the radar controller gave instructions for a 50-degree left turn. Still under visual conditions, the pilot noticed a 1509 ft hill a scant 700 ft to his left, firmly blocking the route he was to take. Voicing his "thanks, but no thanks," on the radar vector, he advised that he would climb straight ahead to a safe altitude first. It was the first time that any member of this crew had transited this base and, recognizing what might have happened had they been on instruments, the pilot wisely submitted an OHR (Operational Hazard Report) upon landing.

Of course, the GCA controller should have known the hill was there. He probably did, but possibly thought the C-130E was capable of clearing it. Also, the departure course given was the same as the approach course for this field. Even if the pilot had memorized the missed approach course and altitude, this vector would have sounded OK if he had been under instrument conditions and hadn't noticed the terrain around the base. Not being familiar with the airfield, another disaster could have occurred. Now, thanks to the OHR, everyone should be educated on this particular hazard at Nha Trang.

But not all hazards have been identified this cheaply. We have only to go through the last few years' accident investigation report files to find some real classical cases:

• A C-135A, expecting a radar-vectored departure which also followed the SID, crashed into high terrain 722 ft above field elevation and 3.9 NM from the end of the runway. Departure and aircraft performance had been "by the book"—for a field with no terrain clearance problem. A month earlier, a near-miss of the same hilltop by a like-model had gone unreported.

• A C-124 making an enroute descent crashed into a mountain when it started descent based upon an ETA and an uncertain passage of an unreliable radio beacon.

• A KC-135 on a GCA was lost on radar scope when its transponder failed. It crashed 3.75 miles from the end of the runway when the pilot descended below published minimum altitudes while attempting to turn the aborted GCA into a tacan approach without having the approach plate for reference.

• A C-130 making a multiple radio beacon approach crashed into a mountain when the pilot misinterpreted passing the first beacon, assumed he had passed the second and descended to final approach altitude.

• A C-121 crashed into a hill on which the VOR station was located when, becoming visual at night, the pilot descended below the low station altitude prescribed on the approach plate.

• A C-124 on departure flew into rising terrain 2.75 NM from the runway and 214 ft above field elevation when the inexperienced copilot at the controls failed to maintain a rate of climb sufficient to clear the known terrain hazard.

• A T-33 crashed 1.5 NM short of a high altitude airfield probably due to misreading of altimeters or hysteresis errors due to rapid descent from high altitude.

• A C-124 crashed on procedure turn while making an unauthorized VOR approach using the approach procedure for a radio beacon located some distance from the VOR station.

• A T-33 crashed immediately after takeoff during a radar-monitored departure while making a tight turn to the departure course.

• A C-118 on a night local hit high terrain while turning to a radar vector to the GCA pattern for a practice approach.

We paid a high price for each of these lessons on instrument flying; in most cases it cost an aircraft and a complete crew. But even if each had been a near-miss, it still would not be acceptable. With 1,002,674 instrument approaches recorded within the U. S. in a single year (1962) and, assuming almost the same number of departures, we can't afford an education through such experience. We have to avoid even the close ones.

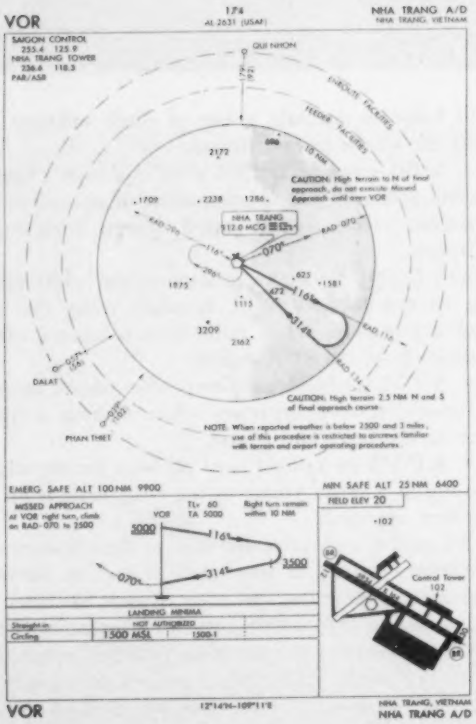
Let's take a look at what's readily available to the pilot and see if there's a less painful way of getting information on some of these hazards to instrument approaches and departures. We'll start with approaches just as if you were on a mission to an

enroute air base. Then we'll look at subsequent instrument departures.

Instrument Approaches

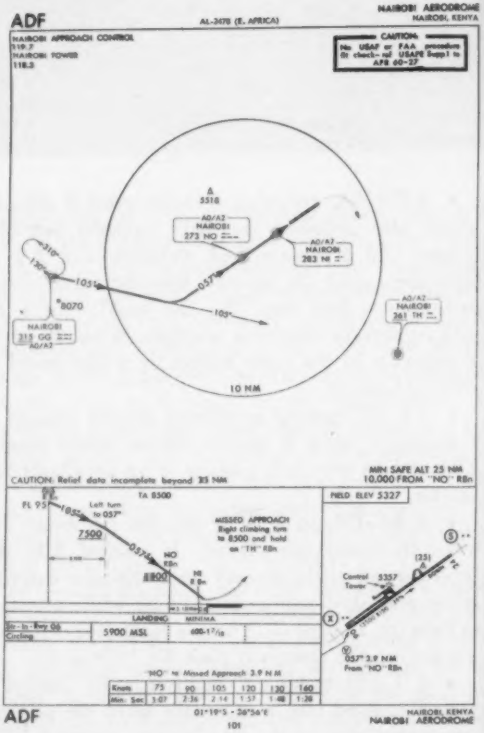
Unless you've had the benefit of an airfield briefing, or have a cockpit mate who's been into the place before, your first view of an enroute field will probably be through the eyes of the fellow who devised its instrument approach procedure. From flight school on, you've probably been admonished to study the approach plate, but what do you study on it? The mechanics of the procedure—frequencies, courses and altitude—are obvious. But what else can we find that might prevent our becoming a statistic on a hillside?

Since our story started at Nha Trang, let's look at the plate for that base. We'll use this for basic comparisons, so most of the plate is reproduced here.



The first thing we spotted on this plate was the note restricting the procedure to aircrews familiar with the terrain and airfield operating procedures whenever reported weather is below 2500 ft and three miles. This note should be a big enough flag to alert a pilot to some dangerous conditions in the area. The adjacent caution amplifies the note, warning of high terrain and an authorized deviation from terrain clearance criteria.

The standards for terrain and obstacle clearance when developing an instrument approach are prescribed in JAFM 55-9 and are, incidentally, uniform throughout military and FAA approach procedures published by U. S. agencies. Possible exceptions will be marked with a warning that the procedure has not been flight checked, as can be seen on this plate for Nairobi. Since the manual isn't normally available to a flight crew, we'll review the standard obstacle clearance criteria.



Low Altitude Procedures

The normal clearance provided an aircraft flying a published route to an approach fix, then descending to procedure turn altitude is shown in Fig. 1. This clearance is 1000 ft above all obstacles through completion of procedure turn, within a specified distance. Normally, this distance is 10 NM on a low altitude approach and 25 NM on a high altitude

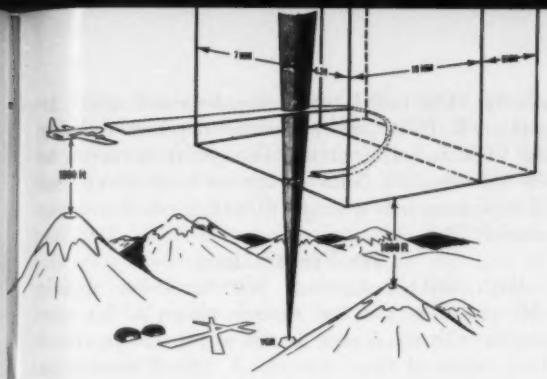
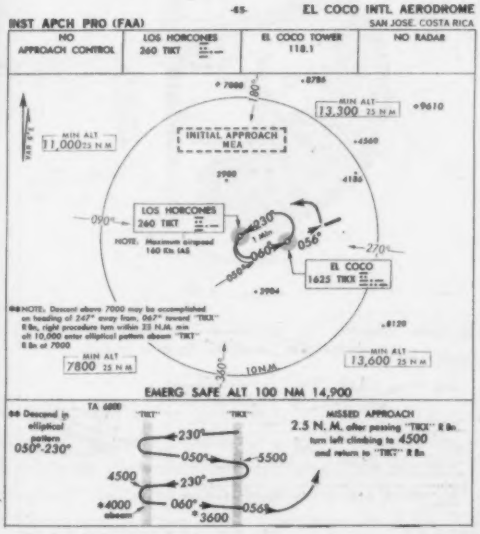


Fig. 1. Maneuvering zones prescribed for obstacle clearance from initial station passage to completion of the procedure turn on a low altitude approach.

penetration, but in certain conditions, such as a field surrounded by high terrain, this can be modified. The approach procedure for El Coco, with descent between two radio beacons, is one good example.



After completion of procedure turn, the prescribed obstacle clearance zone (non-tacan) changes to a blunted wedge, as shown in Fig. 2. It extends 4.34 NM each side of the published approach course at 10 NM out, and narrows to 1.7 NM each side of a RBN or 1.25 NM each side of a VOR. Normally, descent to the published low station altitude within the procedure turn completion distance limit will provide a 500 ft obstacle clearance while inbound to the low station. In the case of a TVOR, located on the airfield, the minimum altitude can be lowered, providing only a 400 ft clearance. Further, if there is a reliable fix, such as a marker, another navaid or DME, less than six miles out on the final approach course, the minimum altitude can be lowered to only a 300 ft clearance. Fig. 2 shows that at Nha Trang

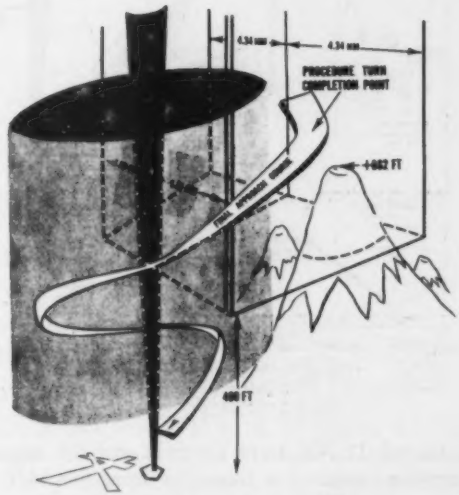


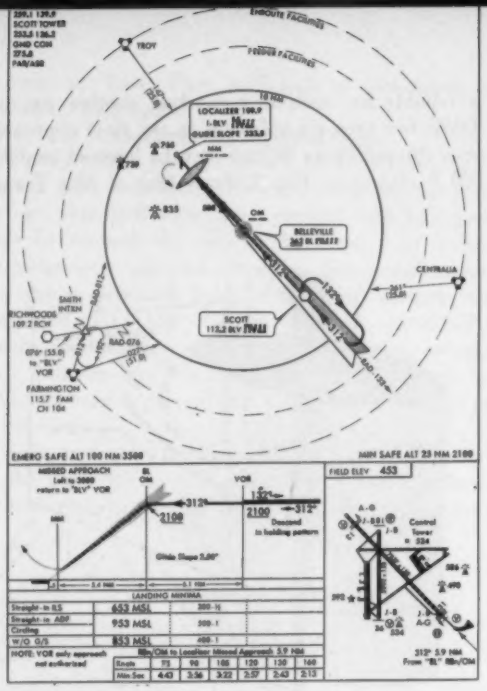
Fig. 2. Maneuvering zone prescribed for obstacle clearance from completion of procedure turn to low station passage.

the hills not only extend through the standard obstacle clearance zone, but up to 662 ft into the maneuvering area above. That's reason enough for both the caution item and the noted restriction.

Figure 2 also shows the zone provided for maneuvering around the airfield. Since this is a VOR, only circling approaches are permitted and the circling minimums will provide a 300 ft obstacle clearance within 1.7 NM of the airfield boundary. Note that on this particular approach, this is outside the field visibility minimum range.

For airfields where the navaid facility is located somewhere off the airfield, an additional clearance zone is provided between the low station and the runway. This zone is the width of the approach zone at the facility and expands to 1.7 NM (at 10 NM) each side of the course to the airfield. Descending to published minimum altitude will clear all obstacles by 300 ft if the field is within 6 NM, 400 ft if it's within 6-8 NM, and by 500 ft if it's within 10 NM. If the airfield is over 10 NM from the VOR or RBN, you must be able to fly from the navaid to the field VFR.

An example of such a case is at Scott. The VOR



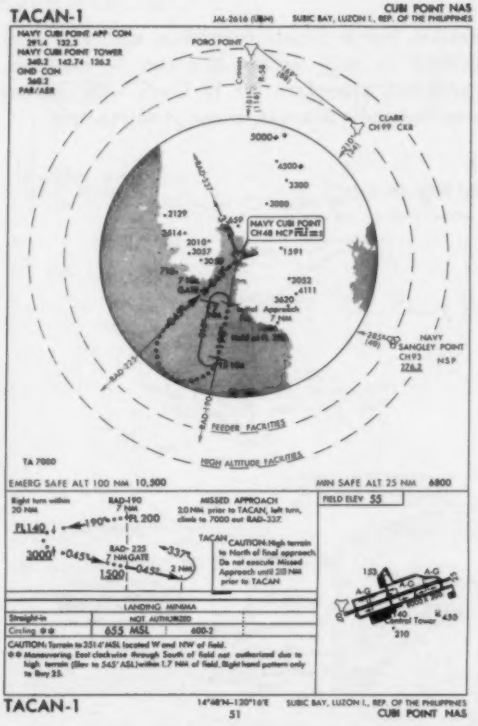
is located 12 NM from the field and the approach procedure requires a transition from the VOR low station to a RBN, from which the approach to the field is made. An aircraft without ADF equipment cannot make this VOR approach, unless the field is reporting above VFR minimums (2100 ft MSL).

Another feature worth comment on the Scott approach is the combination of VOR and VOR-ILS procedures on a single plate. This is a real help to the pilot who, planning to make an ILS, has the precision facility go out of commission at some point just prior to or during his approach. On combination approach plates, the precision minimums will be shown elsewhere on the plate. Non-precision minimums should be applied with a little extra thought. If there is a variation between the field elevation and runway threshold elevation, the precision minimums may be taken from threshold elevation. Hypothetically, *if* the elevation at the approach end of runway 31 at Scott were, say, 420 ft, the ILS minimums might be published as 620 instead of 653. A difference between the last two digits on the straight-in and circling minimums will usually alert you to such a condition.

We have also seen combination approaches published which required three or more frequency changes to complete the approach. In one, the outbound penetration course was off a VOR near the outer marker. Then turning inbound on procedure turn, the pilot was required to fix an intersection on a nearby VOR radial before descent could safely be continued. Next, the procedure required retuning the VOR and, after station passage, transitioning to the ILS localizer. Such an approach would be next to impossible with a single VOR/ILS receiver in the aircraft.

Jet Penetrations

High altitude approach procedures are slightly different from the low altitude plates, to be compatible with the higher ground speed and increased turn radius of these aircraft. A typical penetration procedure, the one for Cubi Point, is shown below along with Fig. 3, a diagram of the obstacle clear-


TACAN-1
CUBI POINT NAS
SUBIC BAY, LUZON I., REP. OF THE PHILIPPINES
NAVY CUBI POINT APP CON
NAVY CUBI POINT TOWER
GND CON
PAR/ASR
PORO POINT
CLARK
NAVY CUBI POINT
NAVY SANGLEY POINT
FEEDER FACILITIES
HIGH ALTITUDE FACILITIES
TA 7000
EMERG SAFE ALT 100 NM 10,500
MIN SAFE ALT 25 NM 6800
MISSED APPROACH
FIELD ELEV 55
TACAN
CAUTION: High terrain to North of final approach. Do not execute Missed Approach until 2.0 NM prior to TACAN.
LANDING MINIMA
Straight-in NOT AUTHORIZED
Circling 655 MSL 600-2
CAUTION: Terrain to 351.6' MSL located W and NW of field.
Maneuvering East clockwise through South of field not authorized due to high terrain (elev to 545' ASL) within 1.7 NM of field. Right hand pattern only to Rwy 35.
TACAN-1
14°48'34"-120°16'E
SUBIC BAY, LUZON I., REP. OF THE PHILIPPINES
CUBI POINT NAS

ance zone provided. As with the low altitude procedure, a 1000 ft clearance is provided throughout the procedure turn. But the zone is teardrop shaped, extending five miles each side of the published courses and 25 NM out from the facility. An additional 5 NM buffer zone is provided, as with the low altitude procedure. This is, however, to compensate for errors in navigation or DME measurement and not to be used for normal maneuvering area.

When a penetration other than a teardrop is depicted on the plate, such as the single barbed arrow

on newly-developed procedures, the high altitude zone is also rectangular. It extends 13 NM on the maneuvering side, 5 NM on the other side of the final approach course, and out to 25 NM unless otherwise noted. An arcing penetration or approach will provide a 500 ft obstruction clearance, 2 NM either side of arcs within 12 NM of the tacan. For arcs of greater radius, a 1000 ft clearance, three miles either side of the arc, is provided. If the arc is 20 NM or farther out, the width of this clearance zone increases to 4.34 NM.

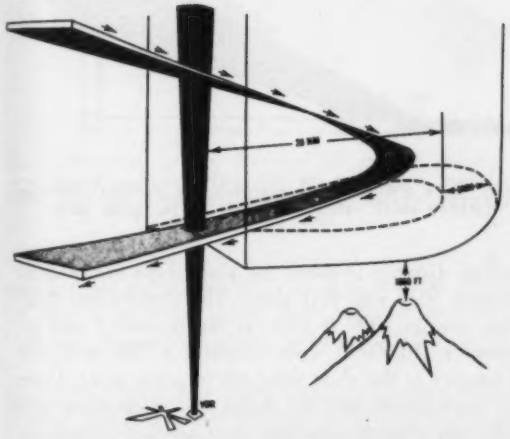


Fig. 3. Maneuvering zone prescribed for obstacle clearance during a high altitude penetration.

A tacan straight-in approach, or final approach from procedure turn, clearance zone is a wedge shape with obstacle clearance decreasing as the station is approached. Initially, as shown in Fig. 4, a 1000-foot clearance is provided. The zone is 4.34 NM either side of course at 12 miles and beyond, narrowing to 2 NM at the 12 NM DME fix. At this distance, the clearance requirement drops to 500 ft until within 10 NM, then to 400 ft until 7 NM from the navaid, where the zone has narrowed to 1.5 NM each side of course. From the 7 NM point to the runway threshold, the clearance drops to 300 ft and the zone further narrows to ½ NM each side of the approach radial.

This narrowing of the approach zone is worthy of a special note. Since the tacan transmitter is normally offset from the runway, the runway usually won't be straight ahead when you establish visual

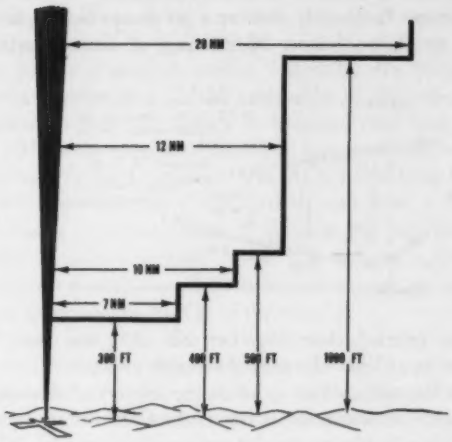
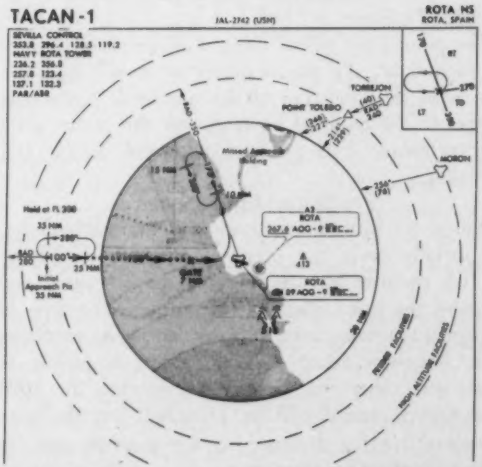


Fig. 4. Maneuvering zone prescribed for obstacle clearance on a tacan straight-in final approach.

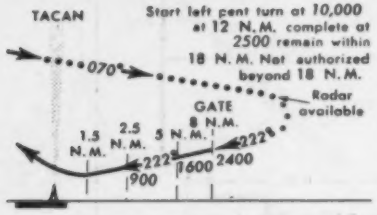
contact. In fact, a turn of up to 20 degrees may be necessary to line up. Also, a situation could exist where, at straight-in minimums, there might be little or no obstacle clearance on one side of the runway. In other words, if the tacan were to the left of the runway, as shown for Rota N.S., there could be an



obstacle off the right side of the aircraft as it made a right turn from the approach course to line up with the runway. So, on a tacan approach, check the plate for final approach/runway alignment and for obstacles near the runway.

The continual step-down in obstruction clearance

requirements is the reason for the numerous altitude minimums frequently seen on a tacan approach plate, such as shown below. Misreading of altitude mini-



mums printed close together like this has been a factor in at least one major aircraft accident.

Incidentally, while we're on the subject of misreading, did you notice the notes on the Cubi Point plate? They're equally as important as those on the Nha Trang plate, but are mixed with penetration and missed approach data and even asterisked with amplification on the bottom of the chart. It's pretty easy to miss data given like that.

A few other items which may or may not be on the approach plate are cautions on large degrees of turn required to avoid prohibited areas. Restricted areas may be depicted if they do not interfere with the procedural data such as procedure turn and missed approach courses. But whether shown or not, the approach makes no provision for clearing the restricted area while enroute to the terminal fix from a feeder facility.

The point here is that there is no prescribed place for such data; it's placed wherever it will interfere least with the depiction of the approach procedure. So, get in the habit of looking over the entire plate and reviewing it if you can with the copilot and navigator.

Precision Approaches

Before we leave the letdown and approach phase, let's briefly cover the precision approaches. Flying an ILS requires the use of an approach plate and provides the same obstacle clearance as the type of instrument letdown used to transition to the precision final. But how about a GCA? Even if pickup is somewhere other than a navigational fix, the 1000 ft clearance should still be provided, but the pilot is responsible for determining his position and insuring obstruction clearance.

As a minimum service, the Rapcon will advise you of what he thinks your position is, but you have to make sure that's *you*. Another aircraft could be responding to turn instructions or SIF code changes meant for your aircraft. We can't think of a better reason for having an approach plate in front of you than to cross-check your position against possible obstacles. Not unless it's having a crutch in case of radio failure, to prevent an accident like the one we reviewed at the beginning of this article.

Now, how about the obstruction clearance on precision final approach? This is, as shown in Fig. 5, the

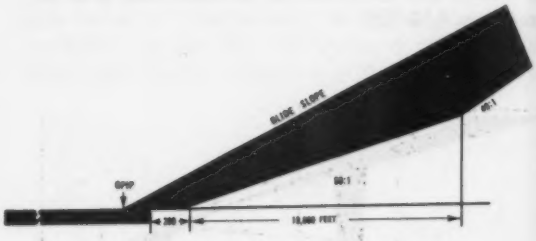


Fig. 5. On a precision final approach, the obstacle clearance (shaded zone) varies with angle of the glide path.

vertical distance between the glide slope and a combination 50:1 and 40:1 slope. The obstruction clearance zone is 1000 ft wide at the threshold and increases to 16,000 ft wide (about 1.3 NM each side of course) at the glide slope interception point. From this we can see that the flatter the glide slope and closer the runway, the less your obstacle clearance.

Incidentally, MAC's published Airborne Radar Approach procedures have the same 100 ft obstruction clearance as other maneuvering procedures. On final of an ARA, a 300 ft clearance is provided, 4 NM on either side of center line at 10 NM and decreasing to 1.7 NM at the threshold. Missed approach clearances, which we'll take up now, are identical with other FAA criteria.

Missed Approaches

The missed approach procedure is an item frequently overlooked on the approach plate. Going back to both the Nha Trang and Cubi Point plates, the pilot who reads only the missed approach heading and altitude is going to be in real trouble as there are cautions against starting a missed approach early and turning into high terrain along the final approach courses.

But what about starting a missed approach a little late to make sure you have passed the obstructions or reached the field? Again, a look at the criteria for missed approach procedures will show the fallacy of such reasoning. For any type of missed approach, the obstacle clearance zone is as shown in Fig. 6.

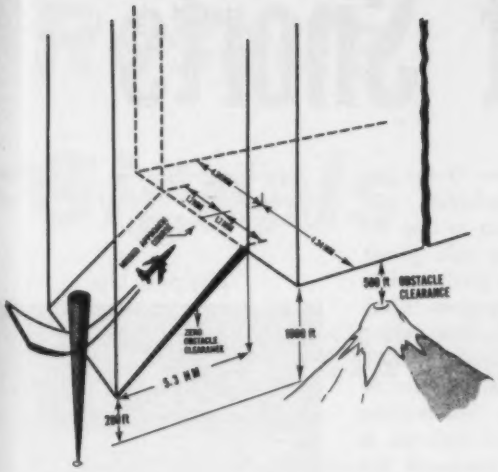


Fig. 6. Maneuvering zone provided for obstacle clearance on a missed approach. Note that the zone starts from the missed approach point and provides zero obstacle clearance for the first 5 miles.

Starting from the runway threshold or missed approach point as published on an ILS or tacan plate, the missed approach gives zero obstacle clearance from obstacles below a plane rising from 200 ft at the missed approach point to 1000 ft approximately 5.3 NM away. This can be especially critical if the ILS minimums are less than 200 ft above the field elevation, as we discussed earlier. Laterally, the missed approach zone is 1.7 NM each side of the missed approach course. If a turn is required, the zone is 1.7 NM on the outside of the turn, provided you keep your turn radius less than 1 NM. At 5.3 NM from the missed approach point, the aircraft will have a 500 ft obstacle clearance until it reaches the published missed approach altitude. Then it will have a 1000 ft clearance with the distance specified, or, if none is specified, within 20 NM of the navaid.

As you can see, there's a life-saving amount of information on an approach plate. Using it enroute, in your before-landing briefing, and during all approaches and landings except at your home station during VFR traffic patterns, plus cross-checking with other crew members can assure a safe arrival.

—Adapted from MAC Flyer

(Ed. Note: This article is the first of a two-part series dealing with instrument arrival and departure procedures. The concluding portion will cover departure procedure exclusively, including a treatment on SIDs and an introduction to the forthcoming use of 3-D.)

Shortcuts to Readiness

By LtCol R. L. Wildey
CO, VMFA-531

Because of our commitment to provide a large number of replacement aircrews to WestPac, there exists a strong tendency to take "shortcuts to readiness." These shortcuts may narrow down the training syllabus to only the most essential flights, but the danger lies in the elimination of the not-so-essential flights that are the building blocks of a good syllabus.

Our fledgling pilots today have a sound background in fundamentals, but airmanship, that precious quality which seems to come only with flight hours, is not being issued at Pensacola in larger quantities because of the situation in Viet Nam. Each of us must take the time to teach this subject in a much more intensive atmosphere.

Teaching airmanship can be expressed in one word —supervision. We need many things but the squadrons are short of supervisors. The CO, XO, Ops O and the Flight Leaders should consider supervision their primary task. These officers have experience, maturity, judgment and in day-to-day contacts with junior aircrewmen, they can intelligently evaluate progress under an accelerated schedule.

Then, when the weakness begins to show, they can step in with the firm supervision that must replace the not-so-essential flight that was eliminated as a "shortcut to readiness."

All the tools required to meet our commitment and provide truly combat ready aircrews are available in every squadron. Careful employment of the material and enlisted strength on hand will do the job, but each day, each hour, we must add a generous dose of supervision. This supervision, this teaching of airmanship on the ground, will be the key to our success.

Short Snorts

No Chute

Following a normal on-speed (135 kts) approach and touchdown 700 ft down the runway, the pilot of an F-4 moved both power levers to idle and reached for the drag chute handle. It wouldn't move on his first attempt, so he tugged on it again—harder. No luck!

Wind conditions were calm, and about 3000 ft ahead of him, on the starboard side of the 8000 ft runway, another F-4 was rolling out. It looked like a go-around situation.

The pilot decided to stay on the runway, however, and after calling "no chute" on the UHF to alert the other pilot, he secured his port engine to reduce residual thrust.

At 105 kts, with 4000 ft of runway remaining, the pilot commenced wheel braking. The starboard main mount blew at 80 kts with 2000 ft remaining. Just before the tailhook engaged the bi-directional water squeeze arresting gear, the port tire blew, but directional control was maintained.

Engagement occurred at 60 kts, 1000 ft from the end of the runway. The lead aircraft was rolling out at taxi speed just beyond the arresting gear cable at this time and sustained limited damage from contact with the cable.

Chute deployment failure had been caused by improper positioning of the drag chute D-ring upper arm during installation.

The pilot's decision to stop the aircraft rather than add power and go around was predicated in part on his several previous failed-chute-landing experiences which had terminated successfully without the aid of arresting gear. In this case, however, his braking technique was short of optimum, as evidenced by the starboard tire blowout. Brake effectiveness thereafter was derogated to a point that use of the arresting gear was necessary to preclude an overrun.

Had the pilot waved off and planned a second no-dragchute approach this incident would not have happened. In this case he was immediately aware at touchdown that he had "no-chute," since the drag chute handle would not move. Knowing this, plus an awareness of a no-wind condition and the presence of another aircraft ahead on the 8000 ft runway, an immediate waveoff would have been the proper decision.

Interestingly enough, this experienced pilot had previously decided that a waveoff was the best procedure on this particular runway if such conditions were ever encountered. Yet, when the actual situation occurred, he elected to continue the landing rollout.

Why does an experienced pilot reason out a logical course of action for a given set of circumstances and then abandon it in the moment of truth? It's anybody's guess, but overconfidence and complacency have been known to creep up on a pilot who has obtained a high level of experience in his model aircraft.

Could it happen to you? Plan your margin of safety ahead of time and stick to it!

Tripped Up!

The T-28 caught in the undignified pose above was a victim of the flush mounted taxiway clearance light shown in foreground.

While proceeding to the runway, the pilot decided to make a short-cut across the corner of an unoccupied ramp rather than follow the taxiway. While angling off the taxiway, he saw the light but misjudged its position in relation to the nose gear.

The wheel rolled up on top of the light and slid off the port side, creating a combination torsion/axial force that exceeded the design limitations and failed the nose gear at the swivel joint.

Although T-28s are known to be highly susceptible to nose gear failures as a result of rolling into objects, keep in mind that flush mounted lights of the type shown here extend four inches above ground level . . . high enough to give the strongest nosewheel a heavy jar.

Rescue Signals Standardized

THE Helicopter Rescue Symposium of May, 1966 agreed on two standard hand signals to be used by survivors in the water to indicate whether or not they need the assistance of the helicopter rescue crewman.

1. Either hand raised in air: "Everything's OK, no help needed."

2. Neither hand raised, both in water: "I need help."

It was agreed that these hand signals should be given *outside the rotor wash* as the helicopter approaches, not inside rotor wash where visibility would be poor and confusion might result. It is planned to publicize the signals by posters and wallet cards as well as decals to be placed inside helicopter cabins.

Representatives of both AirPac and AirLant attended the symposium.

Fig. 1

Raising either hand means "everything OK—no help needed."

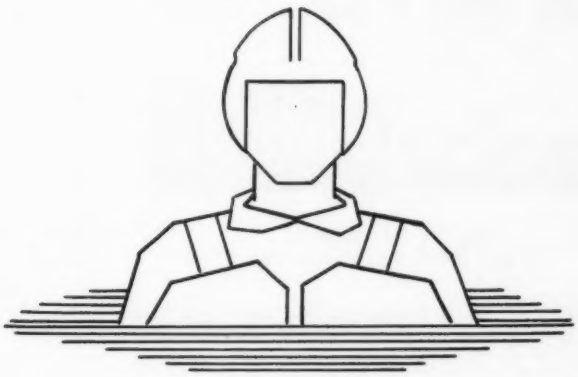
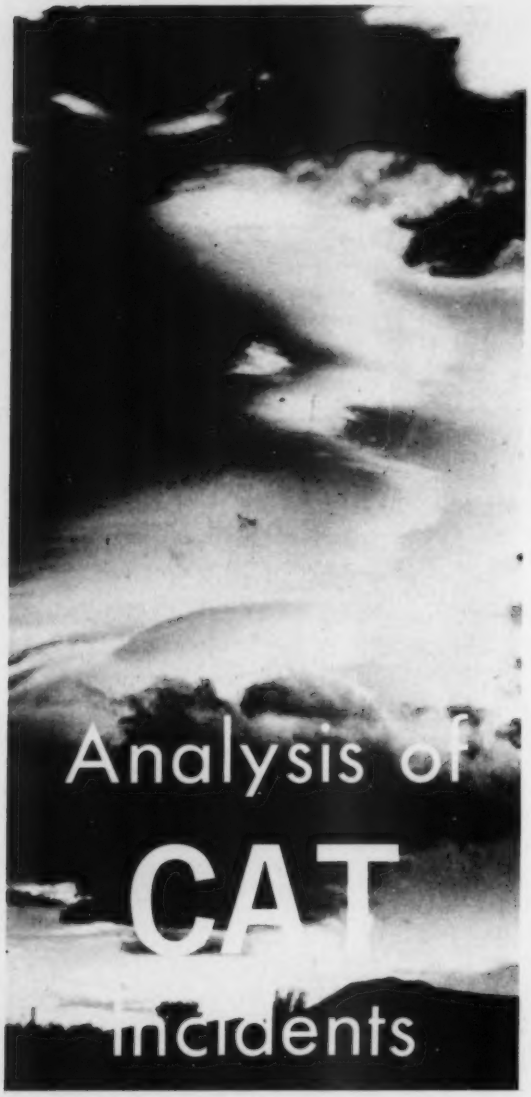


Fig. 2

Neither hand raised, both in water means "I need help."



Analysis of CAT incidents

By M. G. Beard
Flight Safety Foundation, Inc.

When studying turbulence-caused accidents and incidents involving jet transports since 1959, it is difficult to obtain the details necessary to evaluate the assistance a CAT detector would have been to the pilot. The CAB has detailed information on 20 turbulence incidents for the years 1960 through 1963, including one fatal accident. Four of these meet the rigorous definition of a CAT incident, namely, in air free of any cloud or precipitation and remote from convection and weather turbulence. An additional seven occurred in convection areas containing cumulus clouds, but the air was clear of precipitation and the pilot was flying VFR. The remaining nine accidents were instrument flights but there is doubt as to whether the pilot was VFR at the time of turbulence penetration.

Radar could have indicated to the pilot where to avoid the storm cores in the nine IFR incidents. Radar would have been of no use to the pilot in the four strictly CAT incidents and did not keep the pilot out of severe turbulence in the seven incidents occurring in convective areas but in clear air. These incidents could have profited by information which could have been given the pilot by a good CAT detector. The fatal Miami accident of 12 Feb 63 was considered an IFR flight because the pilot was being vectored around severe storm cells. The exact conditions at time of turbulence penetration are not known. About 55 percent of the CAB list of incidents of a drastic nature, where people were injured or structural damage resulted or great loss of altitude and loss of control occurred, are of interest to those endeavoring to develop or obtain a CAT detector.

An analysis was made of the U. S. Weather Bureau's tabulated and coded reports of turbulence from all sources for the year 1964. Only highspeed jet and turboprop powered commercial and military aircraft were used for this analysis, i.e.—DC-8, 707, 720, C-135, B-52, B-47, B-58, L-118, CV-880, CV-990 and *Caravelle*. Only reports of moderate, severe, and extreme turbulence were used. This gives a fair indication of the numbers of incidents to be considered in evaluating the benefits of a CAT detector. None of these turbulence penetrations were fatal.

	Types			*Turbulence*	
Total	*Com'l*	*Mil.*	*Unkn*	*Sev*	*Extreme*
671	259	344	68	163	11
	38.6%	51.3%	10.1%	24.2%	1.65%

The reports do not give the injuries, damage or other information. FAA turbulence reports, however, show many incidents where stewardesses and passengers received minor bruises and sprains from unexpected turbulence and, although it has been impossible to correlate the 259 commercial airline turbulence penetrations from the Weather Bureau reports with reports that list injuries, I estimate from the large amount of data studies in this year's project that a fairly large percentage of these 259 moderate to extreme turbulence incidents would indicate minor injuries to stewardesses and passengers.

In the six years of jet transport operation there

has been only one complete loss of a jet transport known to have been caused by turbulence penetration. This occurred in a storm area while the plane was being vectored around storm cells. Whether the plane was in the clear at the time of the final upset is not known. Several other incidents which also occurred in severe storm areas might have been total losses if the crews had not handled the controls expertly. There are incidents which occurred known to have been in the clear at time of upset and might have been avoided if a CAT detector had been available to give the pilot an indication of turbulence in the clear air ahead on his flight path. I refer particularly to the Houston incident of 11/9/63 and the Dulles incident of 8/20/63.

Although the possibilities of avoiding the one fatal accident of 2/12/63 with a CAT detector cannot be judged because of lack of knowledge about the atmospheric conditions at time of upset, the record of drastic incidents through the six years could have been much better if a good CAT detector had been available.

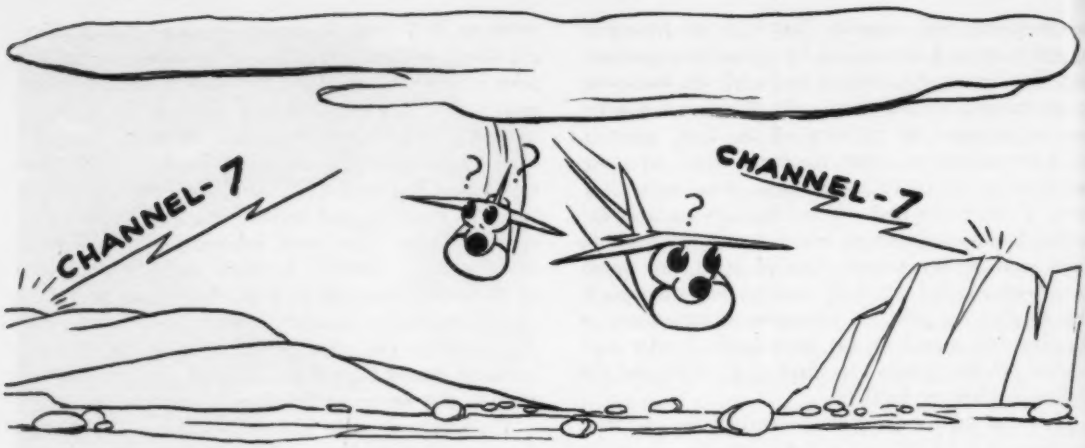
The value of a CAT detector in assisting the pilot to avoid CAT is frequently compared to that of weather radar in storm conditions. Weather radar does not actually delineate turbulence in storms. It outlines the area of particulate matter which in storms is rain or hail and when on contour circuitry mode in storms it defines the locations of steep gradient of rain or hail. From experience it is known that turbulence is encountered when passing through these white lines of steep rain gradients. Turbulence is frequently encountered several miles from storm cores as defined by weather radar, both in surrounding clouds and clear air. A good CAT detector would indicate and define these CAT areas and indicate degree of turbulence to enable the pilot to judge how to handle the situation. If a CAT detector provides this information, it will be a more exact turbulence indicator in clear air than weather radar is in storm areas.

Even with the best forecasting possible with the state of the art there are still unexpected severe CAT incidents in which minor injuries are sustained which detract from passenger ease of mind and enjoyment of flying and increase the insurance bills. The image the airlines have endeavored to create in the public's mind of smooth, quiet enjoyable travel by air would be that much closer to fulfillment if these occasional unanticipated jolts in clear air could be avoided, and if the pilot had the ability to search out smooth flight altitudes and areas ahead.

Of the 20 CAT incidents of 1960 through 1963, seven or 35% were in convective areas but in clear air where weather radar was of no assistance to the pilot in avoiding the CAT penetration. Some of the most severe incidents have occurred in these areas, notably Eastern's at Dulles and Houston, United's over Denver, and Pan American's at Kingston, Jamaica and McGuire AFB. Any CAT detector which is worth installing and maintaining on a commercial transport must give good information to the pilot under these conditions. In these areas water vapor in the atmosphere will be high. There may be thinly spaced particulate matter such as ice crystals and fog particles. The principle upon which the detector is based should have low absorption and good penetration and range under these conditions.

The mountain wave was not considered too seriously by many operators until about 1964. United Airlines and Northwest Airlines are probably subjected to more mountain wave activity in the northwest Rockies than any of the other U. S. operators, and were studying this problem long before the advent of jets. United and American featured largely in the mountain wave which stood over Blanco Peak and La Veta Pass, Colo. for five hours or more on 8 January 1964. Although advised of turbulence, within an 18-minute period UAL Flt. 773 crossed through at 31,000 ft and received 4 injuries; American Flt. 2 went through at 37,000 ft and encountered moderate turbulence but no injuries, and American Flt. 74 descending from 37,000 ft to 27,000 ft got shaken badly, had 8 injuries and nearly lost No. 4 engine. This sequence demonstrated clearly what everybody supposedly knew, that mountain waves are less severe at the higher altitudes. Northwest and United have completed a study of the Rocky Mountain standing wave generating ridges and have rerouted their routes to avoid these areas. Sometimes this required only a slight 10 to 20-mile shift North or South.

CAT incidents of a drastic nature were more numerous during 1963 than in 1962 probably because of the increased number of flights and more jet aircraft in operation. In 1964 the drastic incidents declined probably because of improved forecasting and analysis of the previous accident and incidents and passing these findings along to all pilots in an educational campaign on the handling of high speed, swept wing, aircraft in turbulence; also to greater effort on the part of the operators to avoid known turbulent areas. In 1965 there have been very few drastic incidents in the North American continent. It remains to be seen what the peak season of the 1965-66 jet stream and mountain wave activity will do to the incident record.



Right Channel, Wrong Station

Two F-8's boomed out of El Toro to do some work on the missile range. Visibility down below was pretty cruddy which was about par for the smog bowl but it was a nice day on top of the overcast, sunny and bright.

Control on the range had been good and, after a little orbit and wait, the two got going and were whooping around with a fair amount of burner time. When the range work was finished, a northerly vector and handoff to center started the trip home.

Then the radio trouble started. Lead couldn't get Center on the assigned button. Wingman was trying to relay. Some more channel changes were made without improvement in the situation, but at least tacan was on (good old channel 37) and it showed about the same northerly course as that last vector. The mileage seemed a bit far, but flailing around in burner can put you out a long way.

Since it appeared hopeless to try to talk to Center anymore, the flight switched to El Toro approach and got contact—hooray! A small vector change and then arrival at the approach fix. Approach sounded a bit unsure but lead knew right where he was on tacan—no sweat, they started down with 2500 pounds remaining.

Midway down the descent approach control cut out completely. That blankety-blank radio again! As they started breaking out underneath the gurk large brown hills and a narrow valley strewn with large boulders appeared. What's this? It's certainly not Dana Point! Come on Wingie, back into burner and out of this hole!

As they got back on top, no one answered their call. Approach control didn't seem to hear a thing. Fuel was getting skosh, so it was

ANYMOUSE

The purpose of an Anymouse (anonymous) Report is to help detect or prevent a potentially dangerous situation. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing Anymouse forms are available in readyrooms and line shacks or through your ASO. All reports are reviewed for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

Personnel Equipment Preflight

During a climb in an RA-5C, I noted that cockpit pressurization was not working. Level off was made at FL250 and after cruising for about 15 minutes, the B/N told me to turn to a new heading.

I remember initiating the turn. The next thing I remember is being very groggy, shaking from head to toe and hearing the B/N shouting over the ICS.

It took an enormous amount of effort to make myself ease power and start descending. I had difficulty keeping awake and was shaking so much I could barely keep the wings level. After about 5 minutes at 15,000 ft I began to cease the shaking and became more alert.

The B/N kept up a steady chatter until I became coherent. Then I was shocked when he informed me that he had been shouting at me for about 8-10 minutes prior to my regaining consciousness. Apparently my mask had pulled away from my face slightly and resulted in my breathing insufficient oxygen. I had had a classic case of hypoxia.

Postflight inspection of the Sierra fittings disclosed one spring on one fitting broken. This may have permitted the Sierra on one side to ease open slightly and preclude a tight mask fit. This near catastrophe points up the requirement to thoroughly preflight personal environmental equipment just like the airplane.

time to squawk emergency.

Still no answer. Tacan was still pointing at the station and "miles" were showing in the window but something was really wrong.

Well, there was a little clearance over the hills on that last approach so lead decided to go down for another approach—this time he shallowed the rate of descent as they near the break-out altitude.

Again it was brown hills, a narrow valley with large boulders and still no water. Since there was enough VFR airspace to maneuver in it seemed like a good idea to head southwest.

For a while they ground along, watching the fuel level drop down to a thousand pounds. The next few minutes was it! More hills and valleys were sighted while heading southwest. Emergency procedures were reviewed. All of a sudden the wingman called out an airstrip at ten o'clock—a lovely blacktop strip. It looked firm but not very long.

Lead made a straight-in and wingie fanned out for interval. They each blew a tire but both got stopped O.K. It felt sort of queer when a fellow ambled out and said, "Welcome to Paso Robles, California and our 4500 ft airstrip."

He continued, "We don't get many of you fellows in here. Fact is, it's the first machine like that we've ever seen in here. Where are you from?"

Now, how did it happen? Simple. At the time of this writing there are two channel 37 stations. One at El Toro which shows in the high altitude structure and another at Priest which shows only in the low altitude structure. They seem far enough apart but to the tacan receiver it just depends on the strength of signal. To the pilot it means one more thing —check that ID signal. Identify your station!

Oh, yes, an air station did get the emergency squawk, but figured it was somebody who moved the wrong switch or it was a false squawk which had been giving them problems.

Compass Error

On a solo ferry hop from NAS Hazy to MCAS Smoggy this experienced Anymouse suddenly noticed that the "bay" below was about 2000 miles wide. I checked the standby compass and found about a 90-degree discrepancy.

A quick turn toward land and resetting the G-2 compass helped, as did turning the compass control switch from "free DG."

Use of the checklist would have prevented a need for a quick reorientation to avoid the restricted areas and wasted fuel to intercept the outbound radial.

Reader Questions & Headmouse Answers

Have you a question? Send it to Headmouse, U.S. Naval Aviation Safety Center, Norfolk 11, Virginia. He'll do his best to help.

Correction

In the letter to Headmouse, "Knife on Mk-5A," June 1966 APPROACH, page 23, somewhere along the line between typed copy and the finished product, "AIRASRON 32" was converted to "VF-32." The intended conversion was to VS-32. (To make matters worse, under the caption it appears as VRF-32.) Any embarassment to the letter's author, LTJG Henry W. Dixon, VS-32's survival officer, and any inconvenience to APPROACH readers is regretted.

—Ed.

Mk-3Cs for A-1 Pilots?

Dear Headmouse:

Recently our A-1 (*Spad*) pilots have been asking to wear Mk-3Cs. They claim the Mk-3Cs are more comfortable and lightweight than the Mk-2s. Several other parachute riggers and I have made tests wearing the Mk-3Cs under the NS-3 parachute harness. We are not completely satisfied with the results and would like your views on this subject of Mk-3Cs for *Spad* pilots.

LOFT MOUSE

▶ The Mk-3C life preserver, designed to be worn with the integrated torso harness, is rated by pilots and nonpilot crewmembers of assigned aircraft *not* equipped with lap belts and shoulder straps (*NavWeps 00-35QH-2, July 1965 revision*). The A-1 is equipped with lap belts and shoulder straps. So we're with you—A-1 pilots are not supposed to wear Mk-3Cs.

Very resp'y,

Headmouse

Discarding Mask

Dear Headmouse:

While reading the article "Technique for Nylon Letdowns" by R. E. Miller, HM2, in the April 1966 issue of APPROACH, I came across a statement which is contrary to what I have been taught and what I have been teaching as an aviation physiology technician. Under subhead "Descent Over Land," the author states that after raising the visor "The airman should disconnect one side of the oxygen mask."

If this procedure is followed when either the old bayonet fittings or the Hardman fittings are used to secure the mask to the helmet, there is a very good possibility that there would be some injury to the airman's face due to these fittings flapping around loose. The procedure that should be used, however, is to remove the mask completely and stow it safely on some part of the body if over unfriendly territory. Over known territory, the mask should be completely discarded.

WILLIAM A. JOSEPH, HM2

▶ The Naval Aerospace Recovery Facility originated the article you refer to. This activity is the final word on parachute techniques and is responsible for the Navy's *Parachute Manual*. Here are their comments:

"The practice among the test parachutists, when using O_2 equipment for high altitude bailouts, is to release one side of the oxygen mask soon after parachute opening when no longer needed. This practice is habitual with the jumpers since it is much more comfortable to wear the mask hanging from one side of the helmet after it has served its purpose. During the past four years, NARF test jumpers have made 65 high altitude jumps utilizing oxygen gear, and there were no facial injuries from the oxygen mask flapping around. There is no wind blast effect during parachute descent and the mask does not flap around.

"Removing the oxygen mask and attempting to stow it somewhere on the body would waste valuable time. Throwing the mask away is inadvisable as it can be used to protect the face from exposure while riding a life raft following an emergency descent over water, or the rubber portions of the oxygen mask can be used as a fuel for making a signaling smoke following a descent over land. Other uses were pointed out in the subject article.

"Procedures described in the subject article will appear in a forthcoming revision of the *Parachute Manual*."

Very resp'y,

Headmouse

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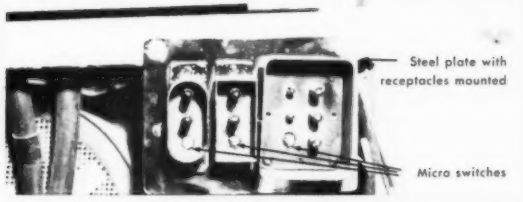
NC-5 Plug-in Warning Devices

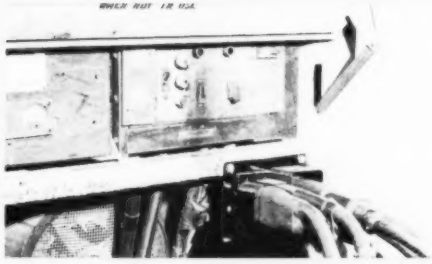
The report of a hapless NC-5 driver's experience yanking the plugged-in starting cables out of a *Stoof* (page 47 May issue) suggested the incorporation of a warning light on the dash of an NC-5. Subsequently, we solicited ideas on the subject from the operators.

As a result J. F. Thompson, AMCS, of NAS Los Alamitos submitted this prototype installation which has been in use since October 1963. It is reported that the original power cords are still in use on the NC-5 and show little signs of wear.

Three salvaged power receptacles were mounted on 1/8 in. steel plate and bolted to the back of the NC-5 (photo 1). One pin in each receptacle is removed and a microswitch substituted (photo 2). The three microswitches are wired in series and connected to flasher type warning light on the NC-5's dash. The ignition switch is connected to the light so that when the ignition switch is ON, there is power to the light. If all three plugs are not stowed, the light on the dash flashes, thereby warning the driver that the plugs are still attached to the aircraft or are not stowed properly.

Chief Thompson states that standard power receptacles are not necessary because satisfactory substitutes can be made of sheet steel and welded to fit the contour of the plugs to hold the plugs when stowed.

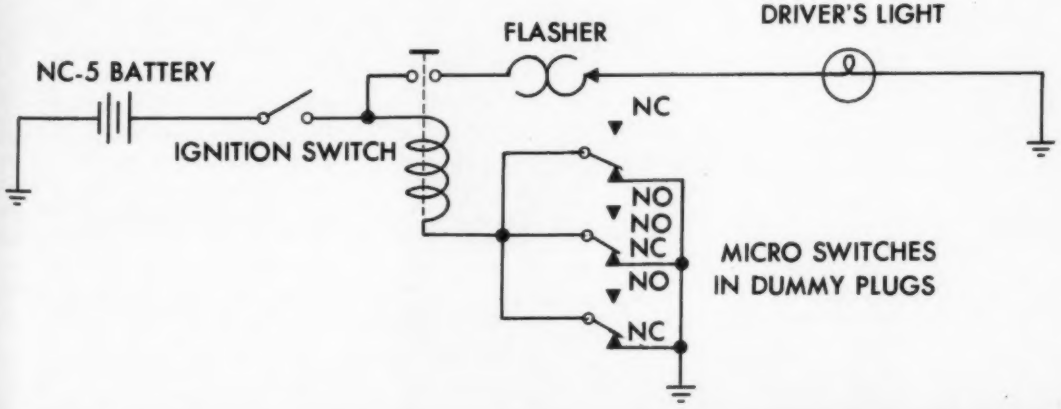




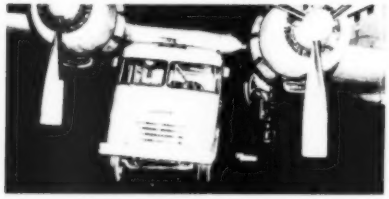
A second contribution was submitted by John R. Maloof, AEC, Service Test Division, NAS, Patuxent River. The wiring diagram illustrated is quite similar to that submitted by Chief Thompson.

Evaluators of these proposals feel that while the warning light may be helpful, a more positive device is desired—something on the order of an NC-5 transmission lockout so that vehicle movement would be impossible whenever the cables are plugged into the aircraft.

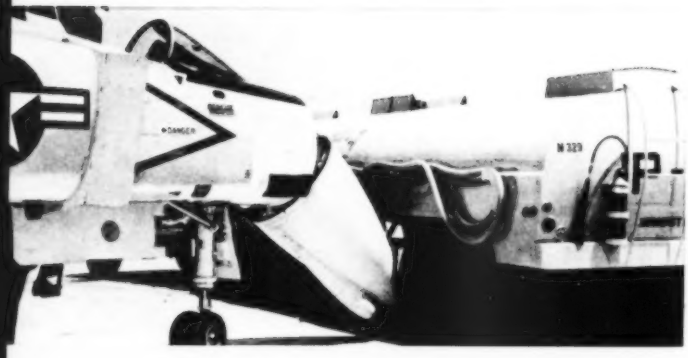
Next!



YELLOW



A van. . .



A JP fueler. . .

An NC-5 starting unit. . .

One category of aircraft mishaps which can and should be completely eliminated is the crunch resulting from yellow gear operation. These mishaps are a consistent and costly detriment to mission-readiness.

After analysis it was concluded that these mishaps can be totally prevented. In almost every one there was one common thread—the operator involved was either unauthorized, untrained, unlicensed, unrestrained, unsupervised or uncontrolled. It is apparent that a lot of "U" is present.

What is missing is "you."

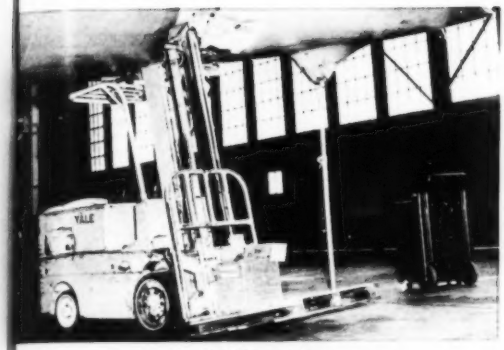
By establishing adequate training and control programs, by insuring that all operators are licensed and by insuring adequate supervision, this drain on our resources can be stopped. Where does your squadron, ship or station stand?

—ComNavAirPac Safety Bulletin

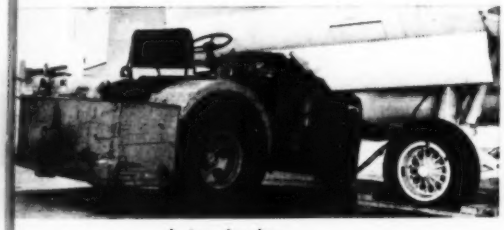
▶ In order to reduce the number of vehicle-aircraft collisions, the Safety Center has recommended the following instructions be incorporated in NavSo—P-2455, Safety Precautions Ashore:

"Paragraph 0407, subparagraph 3 a. *Parked aircraft.* Vehicles shall be prohibited from proceeding within 20 ft of a parked aircraft. Where closer passing, approach to, or maneuvering near a parked aircraft is required as an operational necessity, the vehicle shall stop, and further movement of the vehicle shall be under the direction of an outside observer. When possible, such observer shall be a member of the assigned plane

GEAR



A forklift inside. . .



A tow tractor. . .

An ordnance truck. . .

A forklift outside, and AvGas fueler, below, show why vehicles should not come within 20 ft.

of an aircraft without guidance by you!

crew or unit line crew. Vehicles shall not pass underneath any part of an airplane unless absolutely necessary and then only while under the direction of an outside observer.

These instructions are in consonance with *NavWeps 00-80T-96 ASE General Handling and Safety Manual.* The Air Systems Command (BuWeps) has approved these instructions and publication can be expected according to BuWeps ltr to OIR, NWSA FSA-52:ARE 26 April 1966.

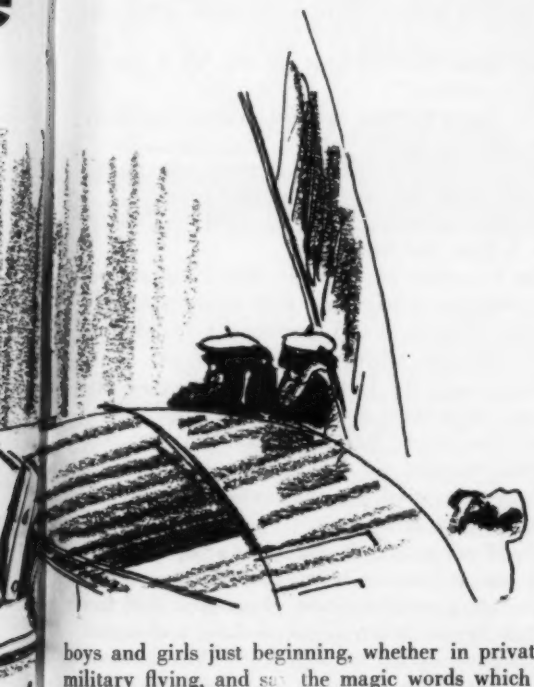
The following, which has been printed in numerous safety publications, tells one of the most eloquent safety stories we've come across in a long time. See if you don't agree.

Grow Old With Me

Recently I took what I am sure was my last flight as a pilot of a military aircraft. I was a member of an outfit which was eliminated in the defense expenditure cutback, and I have ranked and aged myself out of active reserve duty. I would be less than human if I did not at this time look back on my years of flying and try to evaluate the factors which operated to keep me alive, as well as those mistakes which might have killed me.

I felt a resurgence of the impulse to buttonhole the

By Robert W. Duncan
Department of English
University of Southern Illinois



boys and girls just beginning, whether in private or military flying, and say the magic words which will keep their bones intact and send them home each evening a joy to spouse and children.

I can say what I have to say without pride or arrogance because I was a mediocre pilot. I learned slowly; I was not by any stretch of the imagination a "natural." My awareness of my limitations, I am sure, is one important factor to which I owe my life. I did not have the skill to toy with chance and stretch my craftsmanship beyond its capabilities. I would not slow roll at less than 5000 ft because I scooped out at least half the time; nor would I practice spins unless I had so much altitude that the ground seemed as remote as the moon.

There are two kinds of pilots who get hurt: clever ones and poor ones. The clever ones gradually acquire a confidence which may mislead them and tempt them to cross the safety margin once too often. The poor ones are merely incapable. But there is one common attribute which both types possess—they lack imagination. Their thinking is narrow. They fail to consider the possible consequences of a breach of flight discipline or an overextension of their abilities.

They assume that all conditions at all times will be normal. They assume that the ground is flat without obstructions, that the old altimeter is good enough, that there is no other plane in the air, that the weather will hold, that the obsolete chart is reasonably accurate, that the fuel tank was topped, that the field is open, that the mags will clear in the air.

These are foolhardy assumptions resulting from laziness and wishful thinking. If there is one thing we can be sure of in this journey through the cosmos on this thin-skinned pea of an earth, it is that change is constant, nothing is ever the same. It is apparent to me that the human race is invincible. You need only consider the fact that a man who knows he has only one life will offer it to eternity because he is too lazy or too unimaginative to take an extra minute to ask a mech how much oil was put in. Courage like that exceeds the tiger's.

I distilled a single rule from the potpourri of experience, a rule which contains just about all there is to flight safety. It is, however, a mere phrase unless we extend it through every flight activity. It is simply, "Never take anything for granted."

There are plenty of things which we are forced to take for granted without adding to the list. We must accept the evidence of our eyes and nose that the liquid in the tank is aviation gas, that the length of the runway is 8000 ft if the Enroute-Supplement says it is, and that the propeller is pitched at the proper angle to pull the plane forward. We lean heavily on properly trained authorities for vital information, and if they fail us we cannot help it.

But there are those factors, which can be checked personally, which should never be taken for granted. I learned one lesson fairly early, and the nearness with which I came to killing, not myself but another pilot, had an extremely sobering effect.

I was lined up on the runway's centerline with a student under the hood in the rear cockpit preparing for an instrument takeoff. Another plane was lined up in front for the same purpose. My student was on the brakes ready for full throttle when I gave the order. While I could not see over the nose of my plane, I did observe the wings of the first plane recede and disappear as it started down the runway. After a decent interval I told the student to roll and I stayed on interphone to advise and correct him. He did so, and a few seconds later my guardian angel stepped in.

Continued

"Now look, buttonhead," he said to me, "the first plane started rolling and you figure that he is airborne at the end of the runway by now. But you don't see it; you're just taking it for granted."

I took over, hit the brakes, and throttled back. My aircraft stopped 20 ft short of the No. 1 plane which had aborted, probably because the student was veering off heading. I would unquestionably have chewed through at least one cockpit if I had continued. I would have had a memory very uncomfortable to live with.

I owe to a certain vice of mine a good bit of credit for the fact that my wife was cheated out of 10 thousand dollars of NSLI. I am an experience thief; I steal the experience of others.

Your own experience is the worst possible teacher despite the famous dictum. It is much too expensive. I enjoy the nasty habit of appropriating that of other pilots. Every time I read or heard of an accident, I would ask myself "Do I fly in such a way that it could have happened to me?" If the answer was yes, I did my best to correct my habits. Like a parasite, I stayed alive on the flesh and blood of others, and I admit it without shame. I love the taste of hamburger with catsup and onions and I love my wife's embrace in front of the fireplace on a fall evening. My imagination is a vivid one. And when I fail to see the other plane in the traffic pattern when the tower informs me it is there, I panic.

No more hamburger? No more kisses? The cold sweat breaks out, the right hand crooks convulsively for the ripcord handle. No more baseball with my boys? The heart beats faster; the blood pressure rises. No more cans of beer on a hot afternoon? The breath comes short and hot.

Where in the hell is that other plane?

I turn right and left to seek it out. I drop first the right wing, then the left.

Tower: "Nine zero four, are you having difficulty?"

Oh no, how can the thought of a midair collision at a thousand feet suggest difficulty.

I make my voice calm. Nobody must know that I am afraid of a midair collision. After all, am I not a pilot?

"Tower from 904. I do not see the No. 1 plane. What is his position?"

Tower: "He is over the end of the runway on final. You are No. 1 to land."

"And how did it go today?" Cynthia says as the church key bites into the can of cold brew.

"Very nice," I answer. "Do you think it is chilly enough to light the fire?"

I know two pilots whose tragic exits I was able to predict. One was a clever man with an enviable skill and a superb practical and theoretical knowledge of aerodynamics. The other was a wise guy.

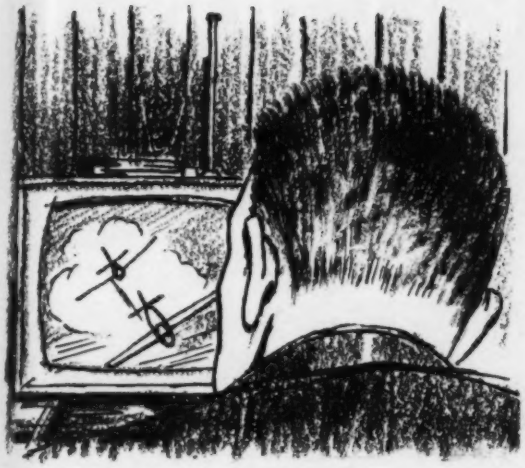
I loved Casey, the first one, like a brother. He taught me much about flying and he was for me St. Exupery and Jimmy Doolittle rolled into one. But he couldn't subtract. He didn't know when his units of safety were reduced to a dangerous minimum. His skill was his murderer.

He could roll at 200 ft and never scoop out. His aircraft was as his own body. This is a fine thing, but there are possibilities over which your skill has no control. Engine failure is one of these, and engine failure when inverted at 200 ft is a troublesome event. A parachute is useless and your choice of pastures is severely limited, even if you complete your roll. Casey did not complete his, and scattered gas, guts, and gaskets over 500 ft of ripening corn.

I was such a mediocre pilot that I never had the courage to attempt such intrepid maneuvers. I mourned the death of Casey, but my grief didn't help him. He has been long gone, and I am here tonight, as I write, watching the scarlet leaves of the maple drift by my window in the moonlight. And yet his craftsmanship far exceeded mine.

Marvell said it 300 years ago: "The grave's a fine and private place, But none, I think, do there embrace."

But I love to stunt. You should see my triple sequence: the split-S, loop, and Immelman, coming right out on the original heading. I start it at 10,000 ft. I'm very proud of it.



The other pilot I shall call Grant. He was a likeable youth, but he lacked humility. He wore his cap on the side of his head and made sharp turns to a landing. He would argue aerodynamics with pilots who had more hours at night flying than he had altogether. Can you imagine yourself advising Saint Ex on the best route to Dakar? Grant would have done it.

One day I said to him after a particularly disheartening discussion (I think he was insisting that a plane in the air would weathercock): "Grant, it matters not to me whether I win the argument, but if you fly like you talk, you will kill yourself."

He snorted, retilted his cap to a more rakish angle and stalked off whistling, "Off we go, ta-ta-ta-tum-tum-tum-tum."

I had no car, and he picked me up every morning to drive to the field. One Monday morning, two weeks after my melancholy prediction, he failed to show and I had to hitchhike. No bus.

The CO was on the phone when I loped in, an hour late. I was nervous and furious; we were flying a very tight schedule. I started blabbing when it was apparent that the CO was waiting for somebody at the other end.

"That damn Grant didn't pick me up this morning! It ain't my fault!" I pounded on the desk.

The CO started talking on the phone and, being versatile like Caesar, wrote a note for me on the pad.

"Grant was killed yesterday."

I had the psychic feeling of inevitability you sometimes get in a poker game when the card you draw is exactly what you expected. Of course, I said to myself, what else could it be?

He had his brother, a visiting cadet, in the rear seat when he pulled the wings off the trainer over Biscayne Bay. The only two boys in the family. And what did his mother think, I wondered. And what did his father say?

It is the same as in driving a car, of course. In tonight's paper is a picture of a new car and a boy shattered against a tree on a sharp turn. The speedometer stopped at 110. My wife is a cautious driver; too cautious, I tell her. She misses golden opportunities to pass other vehicles while I fret and fume. You should estimate relative motion better than that, I tell her.

But who skidded off the road one evening and messed up the family wheels in a stump-filled ditch? You know who.

I said that Casey didn't know how to subtract. I referred to my formula for safety. According to my ingenious reckoning, safe flight is maintained only when you stay above a certain number of what I call safety units.

When you have trouble in an airplane, there are at best a fairly large number of life-saving alternatives. As far as I am concerned, there are more of them in the air than on the highway, where an oncoming car on your side of the road, passing in a curve, may reduce your alternatives to almost zero. These units are your treasure, money in the bank, the buffers against chance, fate, bad weather, or even your own fallible judgment. . .

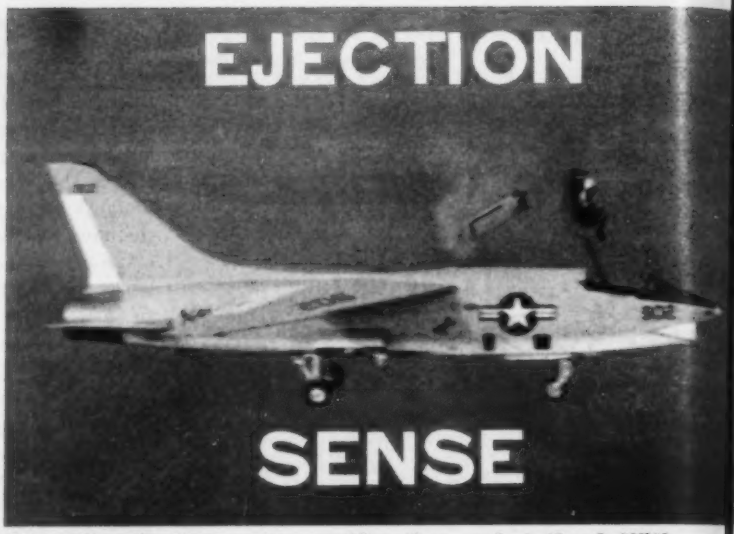
. . . When the hangar-flying drifts around to hairy stories, be proud that your narrative is too dull to relate. Let nothing happen to you worth telling about. Go thou and grow old and stodgy. Get your excitement emphatically by observing the curdling exploits of Jimmy Stewart and John Wayne on the magic silver screen. Titillate your wife by an impassioned account of how the manager of the airport grill threatened to arrest you when you tried to kick your dime back out of an empty candy dispenser.

Now I am a private pilot only. I look forward to dancing the skies on laughter-silvered wings, to winging to my destination in a safe straight line far above the twisting hazards of the increasingly expensive highways. There are no toll roads up there in the blue, no billboards on the clouds, no speed traps, no traffic lights. There is only the challenge to my imagination, and to my good common sense.

I must finish now. The ashes are glowing in the fireplace. Cynthia has the coffee on and I have marshmallows to toast.

—Courtesy Air Facts

EJECTION SENSE



When the ejection system malfunctions, what then? With engine power still available, you have several alternatives.

Once in a great while a pilot steps out of his aircraft, makes a nylon descent, and then discovers that his recalcitrant bird is still careening around in the blue.

A situation something like this occurred overseas recently when a pilot ejected and left his engine running. The unmanned airplane buzzed the local area for a few minutes before crashing into a housing area.

Years ago the pilot of a crippled jet bird pointed its nose toward the ocean, ejected and floated down safely. Meanwhile his errant machine reversed course, meandered over a well-known west coast city and started doing wingovers. Despite the efforts of several rocket-firing interceptors, the hair-raising show continued for the best part of a half hour. Finally the unwanted bird plunged into the ocean.

Accidents like these can provoke a lot of discussion about what a pilot should do with his engine, assuming it is still capable of producing power, prior to a controlled ejection. Get a typical bunch of pilots together in a bull session on the subject and eventually they would probably agree that a substantial power reduction, time permitting, would be a wise move. But how much of a power reduction? To idle? To engine shutdown?

If you look for the answer in the NATOPS Flight Manuals, you'll find only one—the A-4 manual—which mentions power lever positioning prior to a controlled ejection. It recommends that power be set at idle, if time permits, before pulling the go-handle. All of the manuals mention slowing the aircraft in a controlled ejection situation but do not give specifics as to power setting.

Let's look at another situation. Shortly after the No. 2 aircraft in a flight of F-8s lifted off, an unusual amount of fire began emanating out of its tail. Noticing this, the pilot in the No. 3 spot gave his buddy a call. ". . . . you seem to be losing quite a bit of fire out of your tail . . . and a few particles." No. 2 rogered for this information and then called the flight leader, asking if he should have a fire warning light under these conditions. This inquiry was apparently misunderstood by the flight leader and No. 3, who thought No. 2 was saying that he definitely *did* have a fire warning light. The flight leader asked No. 2 if he was out of burner. No. 2 replied that he was coming out of burner.

A few seconds later No. 3 informed the flight leader that No. 2 was apparently still in burner, based on the amount of flame issuing from the tail pipe, and further that No. 2 was burning badly, apparently in the burner section.

Upon hearing this report the flight leader instructed No. 2 to eject if necessary.

After a fatal accident. . .

. . . Investigators found three pins (see arrows) still installed in the ejection seat . . .

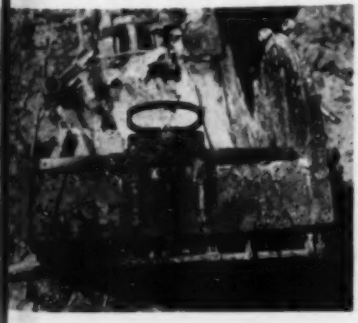
No further transmissions were heard from the distressed aircraft. It was observed to pitch up to about 5000 ft and enter a descending turn to the right. During this turn the aircraft made four nose-down and nose-up maneuvers in a stairstep manner.

The wings were observed to rock twice just before the aircraft struck the ground in a nose-high attitude and exploded. The pilot did not survive.

Initial inspection of the forward fuselage area revealed that the ejection gun (sear), face curtain and drogue gun pins *were still inserted in the ejection seat.* The safety pins for the alternate firing handle and the emergency harness release handle were apparently removed during preflight, since they were found about 50 ft from the seat and attached nylon cords were only slightly burned.

The alternate firing handle was intact and fully seated. The accident board was of the opinion that no attempt had been made to actuate it. All cartridges of the Martin-Baker Mk-F5A seat had been detonated by the heat of the fire.

After an extensive search, neither the canopy actuator pin nor the associated mechanism could be located. The canopy was found about 40 ft short of the final resting place of the forward fuselage. It probably separated from the aircraft on impact or during the resulting disintegration.



. . . Position of the fuel control indicated that pilot probably shut down engine before attempting to eject.

What about the engine?

The condition of the compressor and turbine blades indicated little rotational damage to the engine on impact. According to the DIR, engine speed at impact was very low. The fuel control indicated a throttle setting between *idle and cut-off*, providing further evidence of low engine speed at impact.

The particles that the No. 3 man observed coming out of the No. 2 aircraft were later determined to be segments of the afterburner combustion chamber liner. According to the DIR there was no evidence of overtemp or malfunction type damage in the combustion and turbine section of the basic engine. The report attributed the engine malfunction to deterioration of the afterburner combustion chamber liner as a result of a rapid rise in temperature to a critical degree in a localized area.

Now for the question. Did the pilot shut the engine down and then discover, too late, that his primary and alternate ejection system would not function? The position of the fuel control indicates that this may have happened, since it is highly unlikely that the control could have moved to the position in which it was found, after impact occurred.

Let's suppose that a pilot with a similar emergency, i.e., a known fire in the tail section at low altitude, elects to come back to *idle power* and then attempt, unsuccessfully, to eject using the face curtain. Now, with power available to help him obtain time, altitude and attitude, he can consider several alternatives with greater possibility of success. Naturally, trying the alternate ejection system comes to mind first. Then, not too long ago a lad blew the canopy of an F-8 and went over the side for a successful nylon letdown. Unstrapping and rolling inverted may have worked out okay as a last desperate means of exit.

Finally, there have been several successful landings in *Crusaders* following inflight fires in the afterburner section (see August 1965 APPROACH article, "Unscheduled Fire"). A possibility in this case? Definitely, since the field was only 10 miles away.

Now how about that idle power recommendation in the A-4 manual? Begin to make sense? By pulling back to idle in a controlled ejection situation, you accomplish two important objectives. First, you insure that the bird won't take off on an unscheduled cross-country after you leave, and secondly, provide yourself with a second chance in case you are unavoidably detained in exiting or are forced by circumstances to remain in the aircraft.

In the F-8 accident discussed above, the pilot overlooked essential items during a preflight which, according to witnesses, was considerably faster than that conducted by the flight leader. Undue haste may have been the culprit at this point, but later on, if the pilot did in fact shut down his engine before attempting to eject, he burned the one bridge that could have given him the time and means to regroup and initiate an alternate course of action when the primary ejection system didn't function.

Since this is a partially unresolved problem, procedure wise, it might pay to kick it around in the readyroom some day when even the seagulls are grounded. Hacking the power back to idle before you punch out is the kind of thing you have to discuss and think about before it becomes part of your own instinctive reaction.

Wanted Now—Articles for Approach
Preparing your Manuscript

All writing is hard work—but the rewards of success are high. Writing, and the research that goes with it, is bound to sharpen your ideas and increase your knowledge. There is also real satisfaction in helping others. That's what you are trying to do when you write on a serious subject and naval aircraft accident prevention is serious business. But being serious doesn't mean being dull. Quite the opposite is true because good writing sparkles with facts and ideas.

Your problem then, in preparing an article for APPROACH, is to decide what to say and then say it clearly and effectively. If you can build in an example (illustration) or two, that will help to hold the reader's interest.

Following are simple steps to take in preparing your manuscript:

1. List the key points you want to put across. In doing this, weigh or evaluate each idea with your objective in mind.

2. Arrange the ideas in the order you intend to follow in the final write-up. You may want to start with a few key facts or you may want to describe an event which relates to what you are going to say and give a setting for it.

3. Fill in your outline with a few reminders of what may be said under each topic.

4. Start the research and writing. Research means reading, asking questions, checking for facts and evaluating what others have said on the subject.

5. Now do a first draft. Here are a few tips:

Stick to your subject and include only material which supports your ideas.

Use language your readers will understand but avoid old worn-out phrases. Try for freshness.

Develop your ideas in a logical, straightforward manner—you may give the article a twist for emphasis but your line of thought should be easy to follow.

The first and last paragraphs deserve special attention from the readers' point of view.

Use sketches and pictures when they will add interest and help convey your meaning.

6. Have your draft manuscript read by others. You should choose the readers so as to get good feedback on (1) readability, (2) accuracy and, (3) suitability for your purpose.

7. Let the article age a few days and read it again. Make needed changes. Most successful authors do several rewrites. You owe your readers the best you can do.

8. Be sure all photographs have complete captions and that all pertinent information is attached to the photograph.

9. Have the article typed, doublespaced, and retain one copy.

10. Submit the article.

MAIL YOUR MATERIAL TO

EDITOR, APPROACH
Safety Education Department
Naval Aviation Safety Center
U.S. Naval Air Station
Norfolk, Virginia 23511

*For additional information on the writing craft, readers are invited to review WRITING GUIDE FOR NAVAL OFFICERS, NavPers 10009

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Survival Report

On his second attempt at a night carrier landing, the pilot went low in close and struck the ramp. He ejected successfully as the aircraft skidded across the No. 2 elevator. The aircraft was lost at sea. The pilot sustained very minor injuries and was rescued by the ship's helicopter.

"Opening shock from the chute was hard," the pilot recalls, "and I swung once as I passed flight deck level. I hit the water on my back on the downswing which again was quite a hard jolt. I immediately pulled the toggles on the Mk-3C which inflated immediately. With gloves still on, I released without difficulty the new parachute riser-torso harness fittings (*Koch fittings—Ed.*). I then took off my gloves and began trying to get away from the chute. This proved to be the most difficult part of the ejection sequence. I could not reach the shroudcutter because the Mk-3C had ridden up over the survival vest and shroudcutter. My knife located on my right leg along the shin bone was easily accessible and was used to help free myself from the shroudlines which entangled my arms and protruding parts of the torso harness.

"The seat pack raft was not employed because of proximity of the rescue helo and my inability to immediately find the raft lanyard. A previous movie on helo rescue operations was a valuable aid in recalling the proper procedures for the use of the seat lift and entering the helo.

"Pick-up was uneventful once the helo was able to get the hoist working. Only difficulty was in reaching the seat. The sea was choppy and rotor wash blew salt spray in my eyes while the seat bobbed away. Transfer to the helo was uneventful."

The squadron report summarized comments on survival equipment:

- Koch fittings: in spite of darkness and wet flight gloves the pilot experienced no difficulty in releasing the Koch parachute fittings.
- Shroudcutter (knife): After inflating his Mk-3C, the pilot was unable to reach his shroudcutter because the inflated Mk-3C extended upward over his survival vest. The squadron utilizes a modified SV-1 with the shroudcutter mounted just left of center. Pilots have now relocated the shroudcutter (or installed an extra knife) inside the left thigh of the anti-G suit.
- Reflective tape: The helicopter and witnesses on the flight deck all stated that the reflective tape applied to the pilot's helmet was of primary assistance in locating the pilot in the water.
- Strobe light: All squadron pilots carry a strobe light attached to the right shoulder of the torso harness. In this case the light was not utilized. The pilot felt that the ship and the helicopter had him in sight and so did not turn it on. The helicopter pilot stated that the light would have been a great help since his sighting of the pilot was intermittent. Use of the strobe light has been reemphasized to all pilots.
- Helicopter pickup: The pilot experienced some difficulty in mounting the three-pronged rescue seat due to four- to six ft swells. On his first few attempts, the occurrence of the wave trough caused the seat to be suspended two to three feet above the water. The pilot suffered minor bruises to the inside of his thighs and lower legs before he finally mounted the seat successfully.

notes from your flight surgeon

Release of Koch Fittings

ARE YOU sure that all potential rescue personnel in your area are thoroughly familiar with the workings of the Koch parachute canopy release assembly? Some of these men may have seen the April 1966 *Personal/Survival Equipment* Crossfeed. Others will perhaps read this item. But to make absolutely sure everybody gets the word, a local education program—formal or informal—may be the best answer.

The complete operation of the Koch fitting is described in Air Crew Systems Change No. 41 of 1 June 65 with numerous photographs and drawings.

Release of the assembly requires two steps: Lift the locking hatch cover upward (photo 1). Then rotate the locking bar mechanism downward (photo 2), at the same time lifting the upper part of the assembly attached to the riser. This separates the two parts.

Out Cold with Cold

THE following account which appeared in the *USAF ATC Safety Kit* also has lessons for Navy types:

"Two IP's took off for a weekend nav/pro in their trusty T-33. After the hooded climbout to 35,000 ft, the rear seat IP relinquished aircraft control to the front seat IP. Cabin altitude at this time was 23,000 ft. The rear-seater unhooked his mask to blow his nose. After a few minutes, the front-seater noted no communication from the other pilot. He turned and saw him slumped over in his seat. The pilot revived during the emergency descent for landing at an intermediate base. With the exception of a slight head cold, the pilot was found by the flight surgeon to be in good health. The aircraft oxygen and pressurization systems checked OK.

"Time of useful consciousness at 23,000 ft is from four to six minutes. The physical condition of the individual can cause this time to shorten. A man flying with a head cold, no matter how slight, has less time available. . ."

Mask Cleaning a Must

A COMPREHENSIVE new Clothing and Survival Bulletin, No. 16, titled *A-13A Oxygen Face Mask; cleaning instructions for,*

gives complete information on oxygen mask cleaning requirements, compounds and methods. Cleaning, the bulletin states, shall be accomplished "as often as service conditions require but not less than once every two months." Sanitizing masks not on a personal issue basis shall be accomplished immediately after each use.

Helmet Pays Again

A PILOT rescued from the water after ditching reported he felt his hard hat "bang against the chopper two or three times" before he was finally aboard.

It pays to keep that helmet on!

Make it a Habit

A STUDENT aviator who ejected from a T-2A did not have his visor down during flight or when he ejected. "He could have suffered windblast injury to his eyes and a possible neck injury during ejection," the investigating flight surgeon states. "The necessity of keeping the visor down in daylight flying must constantly be stressed. It should become as much a matter of habit in lowering the visor and keeping it there as it is for the aviator to do certain checks in his preflight check list."

(*For an item on an ejection in which the pilot's failure to have his visor down contributed to permanent injury, see "Visor Up Again," p. 33, June, 1966* APPROACH.—*Ed.*)

Loose Chinstrap

AFTER ejection, a pilot reported that his helmet had been pulled above his head by the windblast. This caused his oxygen mask to be pulled up over his eyes. The pilot stated that he had not tightened the chinstrap on his helmet.

Jacket—Under or Over?

RECENT safety council minutes reflect some confusion on whether to wear the nylon flight jacket under or over the summer flight suit.

Actually, the decision is up to the individual.

The winter flight jacket is fabricated of a nylon outer shell, an orlon insulating layer and a durable, fire retardant cotton inner shell. Although the nylon and orlon materials will fuse upon contact with flame and form droplets, the fire retardant inner shell will act as a barrier and prevent the fused materials from contacting the skin. It would seem that if the jacket is worn over the fire retardant flight suit, the protection afforded would be doubled.

However, the only instruction related to this subject merely says "it is desirable to wear an additional layer of cloth to protect against possible burns from this droplet formation."

Harness Loose

AFTER engine failure, an instructor pilot and student landed a T-28B short. The aircraft skidded through a shallow gully and stopped 380 ft from the runway.

The instructor had not tightened his shoulder harness after checking it locked during the descent. The small amount of play in the harness allowed him to be thrown forward, striking his helmet on the glare shield over the instrument panel. This blow shattered the visor, broke the lip mike, cracked the visor cover, dented the glare shield and momentarily stunned the instructor. The student immediately unstrapped both his lap belt and parachute, climbed out and turned back to ask the instructor if he needed help.

"The student (had) followed procedures and pulled his shoulder straps tight," the flight surgeon reports. The instructor's injuries were very minor. But if a fire or any other situation requiring immediate action had occurred, it is doubtful that he could have responded.

"Safety equipment must be properly used in order to give maximum protection."

Greasy Masks Dangerous

INSTANCES of pilots allowing uncovered oxygen masks to dangle near cables and rails while they are proceeding to aircraft have been reported by a safety council. Grease on an oxygen mask can lead to trouble. This, the council states, is a point for discussion in pilot safety meetings.

Strobe Lights

"A DISCUSSION of the survival gear involved in this accident is not complete without high praise for the strobe type survival lights. The plane guard destroyer officers felt these were, perhaps, the most important items in a speedy and successful rescue. The lights were easily visible for several miles and gave the destroyers excellent guidance to the survivors."

—From an MOR

Mature Judgment

A CONTINUAL and dynamic program must be directed by all command levels on the importance of adequate rest, nutrition, currency in aircraft, and evaluation of the situation—in short, mature judgment. The tiger element in our aviators must be recognized and allowed expression, but maturity of judgment and decision must accompany if maximum utilization of their talents is to be achieved.

—Flight Surgeon in MOR

Are you that someone?

By George Lechak, ABCM

For mishap prevention:
'Take care of the little things and the big things will take care of themselves.'
CG Second MAW

Ever wonder how to "reach" and impress a young AA with vital statistics like: "The accident rate for the last five fiscal years is 1.9 per 10,000 flight hours." The apathetic shrug is discouraging as is: "What's it got to do with me?"

This man hasn't learned the rules. He has yet to belong in and understand the "big picture" in naval aviation. He is unconcerned about statistics because he doesn't understand what they actually indicate and what his role is in the statistical sphere.

Can you adequately explain the accident rate to this AA? Can you give him the "big picture?" Can you impress upon the youngster and make him realize early in his career that only accomplishments are worth remembering and that the old adage: "The man that does not make mistakes accomplishes very little" can be fatal and has no place in the mature, highly sophisticated naval aviation complex? Are you prepared to guide the young sailor along a career of accomplishments?

Where do you start the task of teaching the new man his role in aviation safety? With the Wright Brothers on Kill Devil Hill? On BIRMINGHAM or PENNSYLVANIA with Ely? with LANGLEY in 1922? With the angled deck on ANTIETAM in 1953? They are all milestones in the progress of naval aviation; each has made a contribution to aviation and aviation safety.

The aviation pioneers developed a unique man/machine concept. Men ever since have been improving the concept. The pioneers learned by their errors; they established the precedents that still hold true today.

Naval aviation has come of age. The basic rules have been established and these should be learned.

It takes more than a fast indoctrination course to familiarize the new individual with the steadfast basic premises. The newly designated naval aviator or the apprentice airman will commence a new mishap cycle with the beginning of his career—unless there is someone in charge, someone responsible for bringing him up to date on past mistakes and dedicated enough to select, observe, evaluate and guide him through his early years in naval aviation.

Are you qualified to be that *someone*? So you are just a plane captain, or a chock puller or a lox man! Rules were not established solely for pilots. Aircraft accidents are not limited to ramp strikes, division collisions and section ejections. Many accidents, inci-

dents and all ground accidents are the result of other-personnel error—an infraction of a basic rule.

If you are that *someone*—Air Boss, LSO or catapult holdback man—you must be aware of the fact that the losses and lessons of the past can only provide for safer naval aviation. Be ever-mindful of your responsibilities by saying, "I have the wisdom to use the knowledge gained from the mistakes of others."

During the past five fiscal years thousands of mishap reports have been received at the Naval Aviation Safety Center. Millions of manhours were required to investigate and prepare these reports. An unestimable number of man-hours have been devoted by all levels of command, to the analysis of the conclusions and dissemination of recommendations contained in these reports. The end product of this effort must be equipment and facilities improvement and more efficient maintenance/operating procedures.

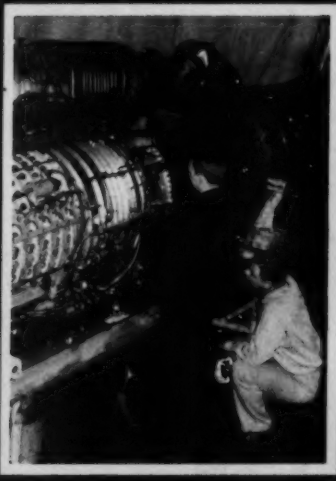
Aircraft losses and damages during this same period amounted to millions of dollars. Whether the loss was caused by material or pilot/other personnel factors, the loss can only be called waste. This dollar waste and manpower waste certainly stimulates the thought, "Why doesn't someone do something to reduce this waste?"

You, as that *someone*, must provide the motivation to accomplish safety in every task that the novice will attempt to do. Too often, motivation down the chain of command is likened to a pot of water set out in freezing temperatures. The freezing process starts at the top and progresses slowly downward, but may never reach the bottom of the pot. If it does reach the bottom, the leader at the top cannot see the results through the opaque, foggy chain reaction.

Motivation must be placed on the fire. The action at the bottom must be more vigorous and the results must be visible at the top. Motivation must be provided by juniors in the chain of command at the working level. The pot must be clear and continuously watched to observe the amount of vigorous bubbling action.

For many men, 1966 can be called "year number one" of their career in naval aviation. Are you prepared to provide the proper instruction/training, supervision/enforcement, and leadership/motivation so essential to orienting the new man in the proper perspective in the *big picture*.

For a better understanding of the problem please read "The Youth You Supervise" beginning on the next page.—Ed.



The Youth You

Adapted from Bulletin 174, U.S. Department of Labor

You, Mr. Supervisor, may well be the key to whether or not the new recruit develops good work habits and constructive attitudes.

As supervisor, you can be a constructive counselor to youth, and your influence will go beyond the immediate job. Helping young people find satisfaction in work has many rewards.

Naturally, you want to make efficient producers out of your young workers. Success will depend on your understanding of what youth are like and your skill in applying general principles of good supervision to youth on the job.

Let's take a look at these young workers.

What Are They Like?

Each one is different. Each is changing at his own rate and in his own way from child to adult. This time of rapid change begins at about 12 to 14 years of age and continues to 21 or 22. The period

For many men, 1966 can be called 'year number one' of their career in naval aviation. Are you prepared to provide the proper instruction/training, supervision/ enforcement, and leadership/ motivation so essential to orienting the new man in the proper perspective in the BIG PICTURE.

Supervise

of greatest stress comes between 14 and 18.

How They Think and Learn

The typical adolescent of 16 or 17 has about attained his adult ability to learn. He has also reached the age when he wants to reason things out—to understand the principle back of the action. He does not argue just to show off.

You'll probably find a sharpness of mind if you look for it. Bright young people are likely to resent being talked down to. However, though they may be intelligent, they acquire judgment only through experience. Their judgment grows as they meet and solve problems.

These youth learn from observing you and their fellow workers as well as from what you deliberately try to teach them. They are especially prone to imitate grownups they admire.

Everyone learns faster when he feels at ease.

Youth may be so absorbed by concern about the new situation they find themselves in that at first their minds are not free to learn.

Success in the first steps is important to learning. If young workers are confronted with failure as they begin a new activity, they may be afraid to try again. You can help them use their mistakes to increase their learning.

Youth may be doing a great deal of intellectual and emotional exploring. This is part of what adults call "daydreaming." They look for answers to big questions—are searching for ideals, for values, for understanding of life. Their idealism makes them responsive to appeals for teamwork, loyalty, and high standards.

How They Feel

Youth are insecure in this growing-up stage. They hate to be laughed at. They don't want to ask questions that may sound silly. Adolescents may feel grown up and confident one day and like children the next. They grow out of this!

When they are in a self-confident phase, they may act intolerant of adults who they think make mountains out of molehills. Everything is simple to them when they are in a conquering mood.

They are often very critical of themselves and sensitive to blame. On the other hand, they are reluctant to admit errors to others and are easily discouraged if ridiculed or criticized too harshly. They may be as critical of others as they are of themselves. They expect a lot from adults around them and feel very let down when grownups fail them.

Youth have a deep need to be accepted as persons in their own rights. When they are treated as adults, they usually respond with adult behavior. They value the respect of adults around them, even though sometimes they don't seem to know how to gain it.

If they feel your interest in them and your desire to help them make good, they'll probably accept you as a friend and adviser.

What They Want

Youth are a bundle of contradictions. They want to be treated as individuals, yet want to be part of their "crowd." They are strongly group-minded and want to be part of a team.

They want to do things in the accepted grown-up way. This makes them try to appear sophisticated. To hide insecurity they may affect a bold manner, or slang, or profanity.

Young people often want different things from a job than do adults. Human relationships are important to them. They usually want most of all to like the people they work with and to be liked by them. They want the boss to like them, too. They will try harder and do better if they feel they are recognized and liked.

But they want job success, too. They may not realize their own limitations or the limitations of the job. You may have to help them set aims in keeping with their abilities and show them how to reach them.

How to Speed Their Progress?

You do for youth all the things you do for other new workers, and always you remember they are young and developing in body and mind. Because they are in that in-between stage when they are not quite adult, some general principles of supervision take on special importance in dealing with youth. Or we slant them differently when we're supervising youth.

The new worker has no shop know-how—has never experienced the routine things you are likely to take for granted in a work situation. You can expect him to react differently from adults. Remember what a change it was for you to go from classroom to workroom.

Develop Good Attitudes

You want your workers to be cooperative, to be willing to pitch in when emergencies arise, to have pride in the organization and to feel they have a stake in it. These cooperative attitudes are a by-product of all the supervisor's dealings with his employees, from the time they apply for a job until they leave his employment. You have a great opportunity to develop good attitudes in your young workers. Go on from there. When you stress the "we" and not the "I," it makes them feel they belong.

You can stimulate interest in the job by helping young workers see why their work is needed and how it fits into the whole pattern of the organization. It helps if you tell them ahead of time when you're planning changes that affect them.

You can develop their initiative by encouraging them to join in figuring out ways of cutting out waste or of making their work easier or better.

Praise your young workers, too, when their work merits it. It may be just the spur they need and will make them feel you're their friend. They'll do more out of loyalty than out of fear.

The language and behavior of the other workers will influence their behavior, too. Encourage the kind of atmosphere you'd consider suitable for your own sons and daughters.

Bad attitudes toward work or fellow workers are cited as reasons for job failure more frequently than inability to do the work.

If young workers act defiant or resentful, it may be just an experiment in independence, or maybe they're identifying you with parents who refuse to let them grow up. If you use an honest approach, you'll enourage cooperative attitudes.

Attitudes are caught, not taught.

Start Them Right

You probably carry out a program of orientation for all new men. You understand that you have to help them all adjust to their new jobs.

Get Instructions

But it takes more time and attention to specific details to get your young workers off to a good start. This is well worth doing because they have many useful years ahead of them if they get started right.

Remember that inside they lack confidence and that it is up to you to relieve the tension. A friendly word can be a lifeline. Once they have some confidence—if they're familiar with their surroundings, know their fellow workers, and understand who's to give them orders—they'll be able to learn faster.

Take time to show them where all the facilities are —and what to do in case first aid is needed. Rules should be explained to them before they inadvertently offend. When they see that rules are reasonable and in the best interests of all, they're glad to observe them.

If you can put them under the wing of a friendly worker with more experience, it will help them feel at home and find their way around. Other workers can help by accepting the young ones in their give-and-take on the job.

A good start is half the battle.

Show Them How

Training workers in job skills is a big part of your job as supervisor. It's always a good idea to plan and organize jobs in short units for beginners. But for young workers this is essential.

Breaking up their jobs into short units eases them into a full workday gradually. Young people aren't used to sticking at one thing for 8 hours a day. School and home tasks usually have been short ones.

You don't just tell young workers what to do—you show them how to do it. Take it step by step. Then let them do it a step at a time. You take it slower and go into more detail than with adult workers because you know they are green.

Talk to them in words they'll understand, remembering that shop terms and lingo will be confusing until they are explained. Make it easy for them to ask questions. When you tell the reasons for doing things your way, they catch on faster. That way they feel that you respect their intelligence and they don't have to show off to impress you.

Young people don't mind your being firm about things that matter as long as you're fair.

Pay Attention

Most beginners worry more about speed than quality. They need to know what you consider of first importance—speed or quality. They may not realize that keeping a steady pace and doing the job right makes a difference to their fellow workers.

Encourage them to think about what they are doing. If they routinely perform an operation, they may routinely repeat the same error over and over until you discover it.

It's as important at this stage for youth to learn good work habits as to master skills.

Keep Them on the Job

Reducing absenteeism by keeping workers accident free and healthy concerns all of us, but most of all it concerns you as a supervisor. Absent workers don't produce.

Youth need more guidance in safety measures than older personnel. They are curious—like to experiment —take more chances. Give them clear orders about safe areas and practices. Point out that doing things the right way means doing them the safe way. Explain what the guards on machinery are for and what hazards the machines involve. Help them see the reasons for safety regulations and cleanup rules. Show them how to lift and carry. Demonstrate safe and proper use of tools and equipment. You must be prepared to teach youth safe practices over and over again.

Safety and health habits learned on their first jobs will pay off for young workers and employers for years to come.

Young people like to learn new ways of using their increasing strength. The jobs with least hazards are best for youth.

Help Them Get Ahead

As a supervisor you are continually checking your men's progress and giving them credit for good work done. Don't overlook your young workers when opportunity knocks for them.

Encourage the ambitious ones and show them how they can get ahead. Watch for developing abilities. If promotion depends on more education or training, tell your young workers where and how they can get it. It's good supervision to see that ambitious young workers get a chance to use their highest capacities.

CRACKED B-NUTS

AFTER discovery of a cracked B-Nut (AN818-D) in a T-39's hydraulic system, further inspection revealed no less than 27 of them. While the report involves the T-39, NASC records indicate that the cause of the problem involves virtually every model aircraft, perhaps to a lesser extent, but worthy of passing it on to the torquing troops.

Investigation of the various causes of cracked B-nuts fell into three categories, in this order of significance:

1. Stress corrosion due to overtorquing,
2. Flaws in material, and
3. Sharp stamping of vendor's trademark on the body of the B-nut.

Some of the cracks extended well into the nut whereas most of them occurred in the skirt portion (see illustration).

Stress corrosion due to overtorquing:

Normal stress corrosion is accelerated at the area of the applied stress by overtorquing the nut to the point where it loses its roundness and becomes oval-shaped. This ovaling is more severe at the edge of the skirt, and so the crack usually starts at this edge and then works along into the body of the nut.

The correct use of a torque wrench is the only sure way to properly tighten a B-nut. Use a properly calibrated torque wrench to torque B-nuts to the values listed in the Maintenance Manual. Maximum torque values are low enough to prevent damage, while minimum torques are high enough to result in a good seal. Above all, don't trust these values to memory—*use the book.*

Flaws in material:

Close inspection of several batches of B-nuts has revealed flaws in the material of which the nuts are made. These flaws are not visible to the naked eye but can show up as cracks after a period of service. Take a good look at the nuts during your inspections. If cracks are detected, reject them.

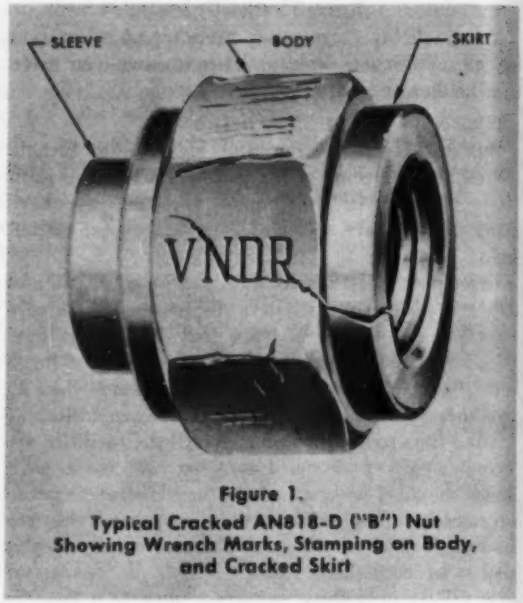


Figure 1.
Typical Cracked AN818-D ("B") Nut Showing Wrench Marks, Stamping on Body, and Cracked Skirt

Stamping of trademarks:

Applying the stamp incorrectly (at an angle) or with too heavy a blow can weaken the material. As in the case above, reject these too.

A Matter of Degrees

WATER boils at 100°C. What does the "C" stand for? We'll feel pretty dumb if all of you know the answer because it came as a surprise to us.

In 1948 the International Conference of Weights and Measurements officially changed the word "centigrade" to "celsius." The National Bureau of Standards also adopted the change. Andre Celsius, a Swedish astronomer, was the originator of the centigrade scale in 1742.—*Engineering Management Group "Newsletter"*

and Comments on Maintenance

Inspection After Tire Tread Loss

LOSS of a tire tread in many cases results in some type of damage to the adjacent area—i.e., landing gear doors, flaps, fairings, switches, bracketry, plumbing, etc. Therefore, after each incident of a tread loss, the adjacent areas need to be checked for damage. Take a good look around.

The type of inspection to be performed cannot be spelled out in a manual procedure because every incident of tire tread loss is different. In one case the flaps may be damaged, in another it may be the doors or components attached to the landing gear. For this reason, basic maintenance practices need to be followed—that is, look at all areas and components which are exposed to damage from the loss of a tire tread. This includes not only the obvious but also those miscellaneous components that are in semi-hidden areas —especially rods, brackets, switches and plumbing attached to the gear assembly.

—A. A. Weekly Maint Ltr

FOD in GTC

AFTER a patrol which ended in the Azores the GTC of a P-3 was started. A few minutes later when the GTC commenced to bang and lose power, it was immediately secured. Upon inspection when the access doors were opened a ball peen hammer fell out of the GTC's hot section almost striking the mechanic in the face. The handle of the hammer was burned. Fortunately, damage was minor because of early discovery.

This incident, like so many others, serves to illustrate the importance of complete tool inventory after every job.—*Contributed by F. J. Haupt, ADJ2, VP-10, Det 17*

High Pressure Air Warnings

A RECENT ground accident report cited a near-catastrophic mishap involving the use of high pressure air (1000-4000 psi) for servicing a nose strut. The use of high pressure air on a low pressure requirement is widely known to be an unacceptable maintenance practice. Yet, the specific warning of this hazard is not reflected in the HMI (NavAer 01—85FGF—2-1).

ComNavAirLant is taking action to insure that all high pressure compressors used in aircraft servicing the Atlantic Fleet are equipped with a decal as follows:

Danger! Not to be used on tires, oleos, struts and other low pressure requirements.

A recommendation was made to the Air Systems Command that all aircraft Maintenance Manuals include such a warning and that the decal installation be implemented Navywide.

GSE Tire Inflation is Hazardous, Too

THE National Safety Council's Air Transport Newsletter recent report of two accidents involving blowing of the lock rings while inflating truck tires brings into focus some little known facts concerning Navy requirements.

Although safety cages were being used in both instances, crushing injuries were sustained because the victim's arm and hand were inside the cage holding the air hose on the valve stem.

NavSo P-2455, Safety Precautions for Shore Activities, article 0524, para. 8.e., states, "Tires on wheels equipped with lock rings must be inflated in a safety cage when removed from wheels. Tires on split wheels must be deflated before removing the wheel from the vehicle and inflated after installing the wheel on the vehicle."

Paragraph 8.g.: "Split wheels: All bolts on split wheels must be tightly secured before inflating the tire. Tire must be deflated before loosening the bolts."

An inflation cage should be standard equipment in every tire shop, and supervisors must insist on its use. An air control panel can be built which will permit the entire inflation process to be conducted without the operator having to approach the cage. An alternate method is to use a remote tire inflation gage. These are available under the following stock numbers:

FSN 4910-204-2354-G311
4910-836-1510-S030
6685-979-6263-S030

Solvent Safety Facts

A fluid that dissolves another fluid or solid by melting, chemical reaction, physical separation, absorption or adsorption may be classified as a solvent. We use various types of solvents for cleaning missile hardware, ground support equipment, and tools, for vapor degreasing, and other cleaning applications. Solvents are selected because of their individual chemical and physical properties, compatibility with materials and safety considerations.

Because of the volatility, toxicity, flammability, and other inherent hazardous properties of solvents, the handling precautions as specified in directives must be strictly observed. Use only the solvent or cleaning agent specified. Familiarize yourself with the chemical solvents and the directions for their use, and act accordingly.

The table illustrates the properties of common solvents and cleaning agents and to a degree, the comparative hazards of each solvent or agent. The solvents are not listed in the order of relative hazard.

SOLVENT	*Rate of Evaporation (Minutes)	MAC PPM	Boiling Point (°F)	Flash Point (°F)	Auto Ignition Temp (°F)
Ether	1½	400	94.3	-40	356
Carbon disulphide	4	20	115.7	-22	257
Acetone	4	1000	133.5	0	1000
Chloroform	7	100	142.3	NIA†	NIA
Benzene	10	35	176	12	1000
Ethyl Acetate	10	400	171	40	900
Trichloroethylene	11½	100	189	NIA	770
Denatured Alcohol	14½	1000	172.3	61	700-800
Toluene (CP)	29	200	230.7	40	1026
Toluene (Commercial)	31	200	230.7	40	1026
Butyl acetate	52	200	258.8	92	790
Butyl alcohol	56	100	243.5	114	650
Amyl acetate	80	200	300.4	77	750
Amyl alcohol	112	NIA	280	100	700
Solvent naptha	115	200	300-421	100	900-950
+Gasoline	124	500	280 (avg)	0 (or less)	495
Turpentine	200	100	309-338	95	488
Freon "MF"	NIA	1000	75	NIA	Nonflammable
Freon "BF"	NIA	1000	199	NIA	Nonflammable

*The relative rate of evaporation was determined by the total evaporation of 5 cubic centimeters of the solvent in a dish 3½ inches in diameter, 3/8 inch in height (inside measurement). Trichloroethylene evaporation rate is an approximate value.

+Gasolines because of varying compositions will also vary in boiling points and flash points.

† NIA—No information available.

—Adapted from "Aerospace Maintenance Safety"

MISSING COTTER

A T-2A was making a touch-and-go landing aboard a carrier. As throttle was added on touchdown the engine responded by going to 100 percent, but could not be controlled further. An uneventful field-arrested landing was made after the discrepant aircraft was escorted to the beach.

Investigation revealed a throttle disconnect had occured—a cotter pin had not been installed. Here's how it happened.

In response to a yellow sheet discrepancy Mechanic "A" disassembled the throttle linkage. In the process of working off the discrepancy he noted a leaking fuel solenoid, stopped the work he was doing and left to initiate action on the fuel solenoid. Prior to leaving, "A" partially reassembled the linkage by replacing a castellated nut but did not replace the required cotter pin, intending to complete the reassembly at a later time. "A" took the necessary initial action on the fuel solenoid but did not document the maintenance action Form (MAF) or the aircraft register concerning the throttle linkage.

Another man, "B," assigned to night check, resumed work on the aircraft in question and satisfactorily corrected the original discrepancy by means of a fuel control adjustment. "B" had no cause to examine or suspect that the throttle linkage needed further attention. The fuel solenoid was replaced, the paperwork completed and the aircraft was "upped" for flight. Unfortunately, .the disassembly of the throttle linkage was not documented and consequently the required Master Quality Control inspection of the assembly was not conducted.

Consequently, the pilot experienced a throttle linkage failure after his first shipboard touch-and-go landing. He made a long, low final from a circular field approach with hook down. Final approach speed was about 145 knots. On signal from an LSO, the pilot turned his fuel handle OFF and made an uneventful landing rolling into the midfield arresting gear at a speed corresponding to a "fast taxi." The engine started to unwind almost immediately following fuel shutoff.

This incident serves again to emphasize how vitally important it is to follow through with the paperwork. Mechanic "A" really "goofed it up"; first by not telling anyone, i.e., by not documenting his work.

The reporting command noted that all maintenance personnel have been firmly reminded that they will never leave anything partly assembled; they will in all cases complete the assembly or else leave the item completely disassembled. Secondly, any time work is stopped prior to completion, a MAOF will be initiated and a registry entry made noting all action taken up to that point.

LETTERS

Spectrometric Setup Info

Montreal, Canada—We are investigating setting up the equipment to do spectrometric analysis of oil for aircraft and fleet supplies. We should appreciate any help and suggestions you can give us along this line.

G. HAZLETT
WARNOCK HERSEY CO., LTD.

• In view of the number of similar requests we continue to receive we pass along the following: Contact:

Navy Department
Air Systems Command,
Code FWMP
Washington, D. C.

Commanding Officer
U.S. Naval Air Station
Pensacola, Florida

Commanding Officer
Wright-Patterson AFB, Ohio

Baird-Atomic, Inc.
Cambridge, Mass.

The latter organization has a small analyzer under development for field units. Inquiries to any or all of these addresses should yield the information desired.

A Unique Approach

MCAS Cherry Point—Enclosed is a photo of our squadron "Bat Box." Weekly, a new question is prepared pertaining to some facet of Aviation Safety, or just plain knowing the bird. The correct choice lights a light mounted on top and an incorrect choice rings an internal buzzer.

It seems that this approach is very effective in aircraft education and has met with more enthusiasm than a verbal or written quiz could hope for.

Bat Box

Its cost was zero and it only took a couple of hours to make. I'd be more than happy to forward a list of the parts we used for anyone interested in a similar box.

JAMES K. ENGSTROM, 1ST LT
ASO, VMA (AW) 242

• Holy Bat Box, Batman, it looks great!

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

Box Lunches

NARTU, Norfolk—The potential hazards which may be encountered as the result of consuming meals of the box lunch, flight ration variety were recently discussed by the NARTU Norfolk Aviation Safety Council. Some of the problem areas were thought to be worthy of passing on for consideration by the Safety Center.

One pilot mentioned two incidents wherein he bit into a box lunch sandwich and discovered a metal staple. The local safety council feels that this hazard may be eliminated by discontinuing the use of metal staples in the packaging of pre-prepared foods in box lunches. Heat sealed wrapping or bags, or scotch tape are offered as alternatives to staples for sealing purposes.

A second topic mentioned was the desirability of having at least a second menu available at galleys which prepare flight lunches. This would enable the pilot and copilot to eat at the same time without both being susceptible to the possibility of food poisoning from the same menu items.

A third consideration was in the nature of a reminder to all flight crews that food items are more prone to spoilage during the warm weather season. Box lunches should be eaten within the time limit indicated on the box. This minimizes the possibility of spoilage and the food poisoning which may well occur as the result of eating contaminated food.

HARRY L. SHEPPARD, JR., LCDR
AVIATION SAFETY OFFICER,
NARTU NORFOLK

• The Food Operations Reference Manual, BuSandA Publication 421, Part XIX stipulates which type of box lunch shall be prepared for each type mission. Beyond

this, however, there is no official policy or OpNav Instruction regarding the specific manner in which box lunches shall be prepared or utilized.

The commercial airlines have a very strict and realistic policy regarding crew feeding. Not only do crewmembers eat on a staggered schedule, but the pilot and copilot eat entirely different meals prepared by different caterers in order to prevent the simultaneous incapacitation of the entire crew by food poisoning. The Navy P-2 and P-3 squadrons at Moffett Field are to be commended for adopting a similar policy of preparing pilot and copilot meals from different food and requiring that these meals be eaten on a staggered schedule. Similar plans could be established elsewhere at the command level, and from a safety standpoint, such would be very prudent.

With regard to the manner of fastening food wrappers, it would be equally wise to avoid the use of metal staples, and, instead, use tape or heat-sealing as suggested.

More on Maneuvering at Weather Minimums

NAS North Island—The May 1966 APPROACH article "Maneuvering at Weather Minimums" did not set forth altitude requirements during the "maneuvering to land" phase of the circling instrument approach; and a little research has disclosed a section of Part 91, Federal Air Regulations directly applicable to altitude requirements during this difficult evolution. Since these Regulations govern naval aircraft operations, and since some pilots rarely see them, Section 91.117(h) of Part 91, FAR is quoted:

"Descent below Landing Minimums. No person may operate an aircraft below the applicable minimum landing altitude unless clear of clouds. In addition, no person may operate an aircraft more than 50 ft below that minimum altitude unless—

(1) The landing minimums are at least ceiling 1000 ft and visibility two statute miles;

or

(2) The aircraft is in a position from which a normal approach can be made to the runway of intended landing and the approach threshold of that runway or the approach lights or other markings identifiable with that runway are clearly visible to the pilot.

If after descent below the minimum altitude, the pilot cannot maintain visual reference to the ground or ground lights, he shall immediately execute the appropriate prescribed missed approach procedure."

Wider Navy dissemination of Part 91, Federal Air Regulations may be in order so that more of us may 'know the rules.'

R. H. STICKEL, LCDR
ASST. OIC, NAMTC, WEST

Improper Modification of Tools

NAS, Los Alamitos—Concerning the photo of a wedding band welded to an open-end wrench, page 40 of the June issue, note that this wrench has been ground down on the outboard side of the jaws.

This is a dangerous practice as breakage could cause injury to the person using the weakened wrench. Furthermore, tool manufacturers will not warrantee any tool which has been thus modified.

H. W. BURSON
ASO, VA-6

• **Good Advice, Safety Officer Burson. In view of your comments the picture is now worth two thousand words instead of the captioned one thousand words. Mr. Burson is an expert in this field—when not making like an aviator, he is District Manager of Pendleton Tool Industries, Inc., in Los Angeles. See next letter.**

Worth Thousand Words

Sheppard AFB, Texas—We in the 3630th Flying Training Wing Safety Office, were most impressed with the picture and caption. . . . The vivid illustration of a wedding ring welded to a wrench is truly worth a thousand words. For this reason we would like to reproduce the picture in our Wing Accident Prevention Program. Your assistance will be appreciated.

JERRY N. PRESTON, CAPT., USAF
FLYING SAFETY OFFICER

• **Good show! A copy of the photo is underway.**

Quotable

The week was accident-free but there were precautionary landings, hydraulic failures, generator failures, brake failures, forced landings, blown tires and hot brakes. These were, each and every one, a potential accident.

Prevention of some would not have been humanly possible but most resulted from *somebody* not doing his job. The pilot that leaned on the brake too hard, the maintenance man who didn't torque the fittings properly, the ordnanceman who didn't check the circuitry, etc.

The majority of major accidents have just such a beginning and result from a chain of accumulating events. They, like those enumerated above, could have been prevented had any one of the incidents in the chain been handled correctly. If we are attentive to the prevention of such incidents, we will virtually preclude the possibility of major accidents.

Take care of the little things and the big things will take care of themselves—*CG 2nd MAW.*

Please read "Are You That Someone? Page 36—Ed.

Superintendent of Documents
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Vol 12 **approach** No 2

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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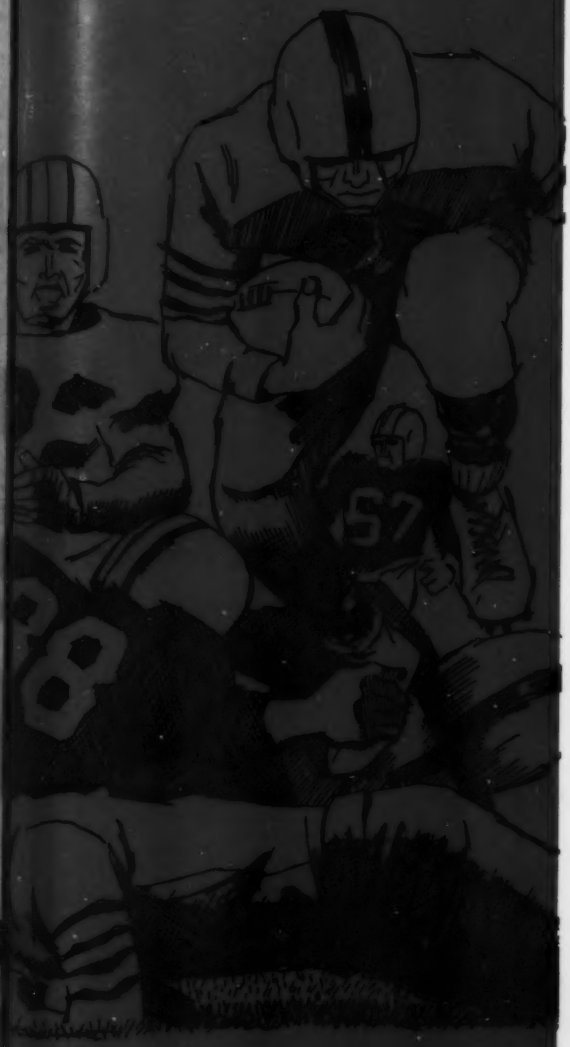


By CDR W. H. Lowan
Executive Officer, VT-23

Ed Note: It was my good fortune to capture on paper CDR Lowan's observations made during a recent Naval Aviation Safety Center visit to NAAS Kingsville. This readyroom delivery, though aimed at the fledgling pilot, conveys a reminder to all.

* * *

Men, for many years I played collegiate football in an amateur status. After my schooling was complete I turned to pro-football where I received a real eye-opener. In pro-ball there is little wasted effort. Each man on the team knows exactly just how far to go in his specialty as end, center or whatever because the lines of authority are quite clear when spelled out by the coach and your contract.

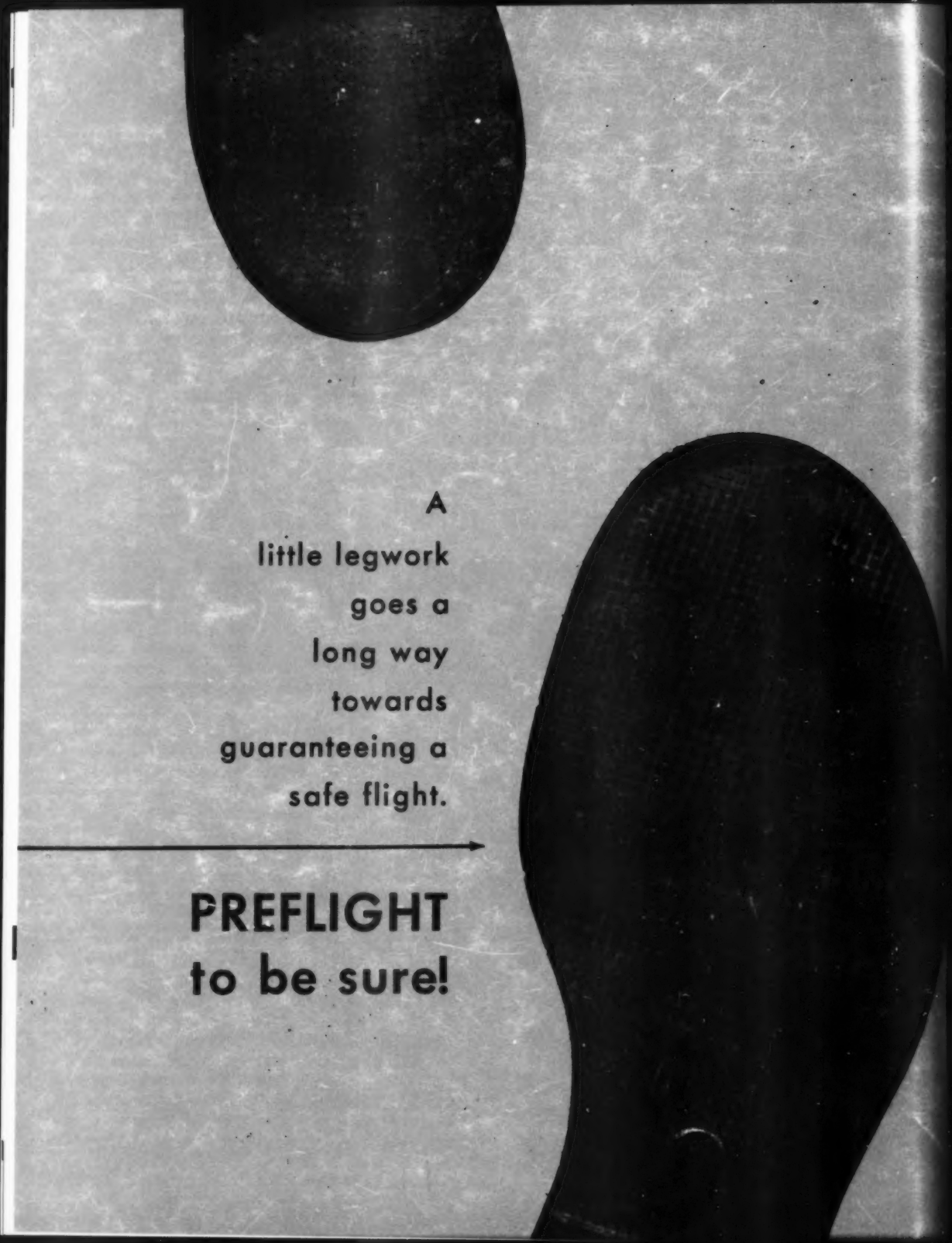
Obviously college football is very demanding and teamwork is a must if you are to win but the latitude of operations is so much greater. The "individual" can and often does "shine" while the other team members remain in a less colorful background, though contributing to the total team effort.

When I left pro-ball for a naval career in aviation, it didn't take long for me to see the same comparisons between the amateur and the pro in this field of endeavor. In the early years preceding BN, (before NATOPS) the amateurish approach to aviation was quite prevalent with the "individuals" of the various squadrons all trying to be more colorful than the next guy. As the grim statistics remind us, some were spectacular. Safety was given a passing nod and a knowing wink-of-the-eye.

As newly commissioned officers and pilots about to leave the training command for your first squadron tours, I would like to offer this observation.

We are all shooting for the same goal—to be the best in our chosen field—naval aviation. You have been instructed by some of the best talent in the fleet, so remember as you leave VT-23 you leave your amateur standing behind and join the ranks of the professionals.

NATOPS and safety are synonymous with the "pros" of the fleet. Your future squadron's level of combat readiness will be directly proportional to you and your team effort. See you in the fleet. . . .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